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culture

Forest
Service

Washington, D.C.

Report of the Forest Service

Fiscal Year 1986

RPA

The Forest Service

The Forest Service, U.S. Department of Agriculture, is responsible for Federal leadership in forestry. It carries out this role through four main activities:

- Protection and management of resources on 191 million acres of National Forest System lands.
- Cooperation with State and local governments, forest industries, and private landowners to help protect and manage non-Federal forest and associated range and watershed lands.
- Research on all aspects of forestry, rangeland management, and forest resources utilization.
- Participation with other agencies in human resource and community assistance programs to improve living conditions in rural areas.

Chief

12th and Independence Ave., SW
P.O. Box 96090
Washington, D.C. 20013-6090

National Forest System

Northern Region
Federal Bldg.
P.O. Box 7669
Missoula, MT 59807

Rocky Mountain Region
11177 West 8th Ave.
P.O. Box 25127
Lakewood, CO 80225

Southwestern Region
Federal Bldg.
517 Gold Ave. SW.
Albuquerque, NM 87102

Intermountain Region
Federal Bldg.
324 25th St.
Ogden, UT 84401

Pacific Southwest Region
630 Sansome St.
San Francisco, CA 94111

Pacific Northwest Region
319 SW Pine St.
P.O. Box 3623
Portland, OR 97208

Southern Region
1720 Peachtree Rd., NW.
Atlanta, GA 30367

Eastern Region
310 West Wisconsin Ave.
Milwaukee, WI 53203

Alaska Region
Federal Office Bldg.
P.O. Box 1628
Juneau, AK 99802

State and Private Forestry

State and Private Forestry offices are located in the Regional Headquarters, except for the Eastern Region. This S&PF office is at:

Northeastern Area—S&PF
370 Reed Rd.
Broomall, PA 19008

Forestry Research

Intermountain Forest and Range Experiment Station
507 25th St.
Ogden, UT 84401

North Central Forest Experiment Station
1992 Folwell Ave.
St. Paul, MN 55108

Northeastern Forest Experiment Station
370 Reed Rd.
Broomall, PA 19008

Pacific Northwest Forest and Range Experiment Station
P.O. Box 3890
Portland, OR 97208

Pacific Southwest Forest and Range Experiment Station
1960 Addison St.
P.O. Box 245
Berkeley, CA 94701

Rocky Mountain Forest and Range Experiment Station
240 West Prospect Ave.
Fort Collins, CO 80526

Southeastern Forest Experiment Station
200 Weaver Blvd.
Asheville, NC 28804

Southern Forest Experiment Station
T-10210 U.S. Postal Service Bldg.
701 Loyola Ave.
New Orleans, LA 70113

Forest Products Laboratory
Gifford Pinchot Dr.
P.O. Box 5130
Madison, WI 53705

United States
Department of
Agriculture

**Forest
Service**

February 1987

Report of the Forest Service

Fiscal Year 1986

Chief's Message

I am pleased to transmit the Report of the Forest Service to Congress for Fiscal Year 1986. It describes Forest Service accomplishments in managing the 191 million acres of National Forests and Grasslands, providing technical and financial assistance to States and private landowners, and conducting forestry research.

The year 1986 was a milestone in the integrated planning of the Nation's vast forest resource. The third Forest and Rangeland Renewable Resources Planning Act Program was sent to Congress. It was accompanied, and based on, an update of the 1980 Assessment of future demands for forest products and services and the potential for meeting them while protecting the important resource base needed for this and future generations.

Tied to this national planning framework are the 123 National Forest land and resource management plans required by the National Forest Management Act. Of these plans, 65 are final, and 54 have been issued for public review in draft form. As Forest plans are completed, they are being implemented to bring about integrated, cost-effective, and balanced multiple-purpose management of the National Forests.

As a result of careful planning, the Departments of Agriculture and Interior transmitted to Congress a proposal for interchanging jurisdiction on almost 25 million acres of public and National Forest System lands between the Bureau of Land Management and the Forest Service.

For the second year in a row, severe drought conditions in the Southeast and intense dry lightning in the West led to crisis fire situations. The Agency dispatched firefighters and equipment at a record rate.

Related to fire, the Forest Service also joined with the National Fire Protection Association and U.S. Fire Administration in initiating a nationwide program to protect the lives and homes of municipal populations spreading into forests and other wildlands. This program will focus on helping local communities reduce hazards and losses to life and property from wildland fires. A research program will be tied to the initiative.

We conducted priority research during the year on ways to increase forest productivity and timber utilization, enhance forest protection, and develop technology to solve problems in multiple-resource management, basic biology, and atmospheric deposition.

Despite the tightening fiscal structure, accomplishments could also be measured in increased receipts, too. Revenues to the U.S. Treasury totaled $1.32 billion, up 14 percent from 1985, for goods and services provided by the Forest Service.

The overriding theme for the year, however, was a commitment to the Agency's tradition of working to strengthen the Nation and increase its wealth--economically, environmentally, and spiritually. During the year, the Forest Service renewed that commitment with a Vision Statement based on certain values that have stood the test of time. These values of conservation leadership, public service, responsiveness, integrity, a strong land ethic, and professionalism will continue to serve as the guideposts in managing the change and challenge of the future.

The values and principles described in the Introduction and in the 1986 Report to Congress are evidence that the business of the Forest Service is unwaveringly focused on its mission of "caring for the land and serving people."

F. DALE ROBERTSON
Chief

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1/ Includes cooperative law enforcement.

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Introduction

CARING FOR THE LAND AND SERVING PEOPLE

Our Mission

We care for the Nation's forests and rangelands. We serve the needs of the people who own them. In short, we strengthen the Nation for future generations--and we are proud of our role.

The Forest Service is a leader in the conservation and wise use of the Nation's forests and rangelands. We manage 156 National Forests, 19 Grasslands, and 16 Land Utilization Projects. We cooperate with the States in helping private landowners apply good forest practices on their lands, and we do research to find better ways to manage and use our natural resources.

A Proud Heritage

Our Conservation Philosophy

On February 1, 1905, President Theodore Roosevelt signed the Act transferring the Nation's Forest Reserves from the Department of the Interior to the Department of Agriculture. That same day, Secretary of Agriculture James Wilson endorsed Gifford Pinchot's conservation philosophy of wise use and service to the American people. The Forest Reserves, later renamed the National Forests, were to be managed for the greatest good for the greatest number of people in the long run. Local questions were to be decided by local officials--a philosophy that has made the Forest Service one of the most decentralized and responsive agencies in the Federal Government. So the Forest Service has been committed from its very beginning to working closely with local people while responding to national interests and needs.

Values and Principles

Early forestry leaders like Theodore Roosevelt and Gifford Pinchot combined vision with action. Their principles and philosophies helped mold Forest Service values and culture that have stood the test of time--conservation leadership, public service, responsiveness, integrity, a strong land ethic, and professionalism characterized by people who know their jobs and do them well. These values and principles are the bedrock on which the Forest Service stands--they will support us as we adapt to, and thrive on, change and challenge.

The Future—Strengthening the Nation

The Forest Service is committed to our tradition of strengthening the Nation and increasing its wealth--our economic, environmental, and spiritual wealth. Our forests and rangelands are true national treasures. We appreciate the beauty and bounty of these lands. We will keep them healthy and productive. We will keep the air and streams clean and the fish and wildlife abundant for the use and enjoyment of our Nation's people.

Natural Resource Management

The Forest Service will cooperate with our many partners to improve management of the Nation's forest and rangeland and all of their resources.

We have a special responsibility to manage the 191 million acres of National Forests and Grasslands as models for multiple-use sustained-yield management. We are committed to wise use and balanced consideration of all natural resources. We will follow a conservation philosophy that will bestow to future generations the opportunities we now enjoy. These include high-quality water, wood, and paper for homes and hundreds of other uses, forage for wildife and livestock, wilderness and outdoor recreation for enjoyment and relaxation, quality habitat for many plants and animals, and a source of important minerals.

Research will continue to expand the scientific basis for forestry, range, and natural resources management. We will make significant progress in key areas, such as acid rain, insect and disease control, wood utilization, and ways to better manage forests and rangelands for all of their values. We will share this knowledge and experience to improve both the Nation's and the world's forests and rangelands.

Public Support and Trust

The years ahead will be challenging. Many people care about, and have often-conflicting needs and concerns about how these lands should be managed. Every citizen of the United States is a "stockholder" in the lands we manage and the research we produce. Their views and thoughts are important in everything the Forest Service does. They are also entitled to an equitable share of the benefits our forests can produce.

We will work hard for broad public understanding, trust, and confidence in what we do. We can earn this by giving quality public service, communicating accurately and openly with the public, and being attentive to public needs and values. We will be good neighbors and good hosts. We will support our partners and work with them in a spirit of cooperation to achieve balanced natural resources management.

Our Greatest Strength--Our People

Recognizing that our greatest asset is our people and that our greatest strength lies in our performance, we will become a more effective and productive organization. We will promote a management climate which fosters teamwork, esprit de corps, innovation, creativity, common sense, and the open expression of ideas. We will experiment with and test new ideas, fully recognizing that some will not work, but adopting those that do.

We will have a workforce that better reflects the national diversity. Every individual is important in achieving the overall mission of the Forest Service. We will keep our employees informed and promote a strong sense of purpose.

Finally, we will strive to make each person's work interesting, challenging, rewarding, and fun--more than just a job!

FOREST AND RANGELAND RENEWABLE RESOURCES PLANNING ACT (RPA)

Overview of RPA

The Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended, directs the Secretary of Agriculture to prepare a comprehensive, long-range assessment of the Nation's renewable resources and to develop a program for Forest Service activities.

The most recent Assessment was completed in 1979 and supplemented in 1984 to account for significant changes that had occurred since 1979. The 1985 RPA Program Update, covering 1986 to 2030, was transmitted to Congress in September, 1986. Currently, work is underway on the 1989 Assessment and the next Program Update scheduled for completion in 1990.

1985 Program Update

The 1985 RPA Program Update identified a range of resource options recommended by the Secretary of Agriculture to permit consideration of both the current Federal deficit situation and our long-term resource goals. Both Bounds of the Program respond to the long-term renewable resource needs of the American people as described in the Assessment. The upper portion of the range, the High Bound, reflected earlier and greater investment to meet the long-term rising demands for resources. The lower portion of the range, the Low Bound, defers some investments in response to the immediate need to reduce costs as a means of reducing the Federal deficit.

The Program is designed to make wise and efficient use of our National Forest System lands in light of our objectives of reducing costs, enhancing revenues, and improving efficiency. The Program recognizes the importance of non-Federal lands in meeting our long-term resource needs and emphasizes the contribution needed from research to take full advantage of our national resource opportunities.

The President transmitted his Statement of Policy and the 1985 RPA Program Update to Congress on September 19, 1986. The Statement of Policy follows the tables at the end of this report.

Annual Report to Congress

The RPA requires the Secretary to submit an annual report to Congress on Forest Service accomplishments and progress in carrying out the RPA Program. This report covers fiscal year 1986 2/.

Required in the annual report are the following:

- A description of the status of major research programs, significant findings, and ways these findings will be applied in programs.
- A description of the cooperative forestry assistance programs, and their accomplishments, status, needs, and work backlogs.
- A report on the progress of incorporating mandated standards and guidelines into the land management plans for units of the National Forest System.
- A summary of estimated expenditures--on a representative sample basis, for reforestation, timber-stand improvement, and the sale of timber from the National Forest System—compared to the return to the Government from such timber sales.
- An identification, on a representative sample basis, of advertised timber sales made below the estimated expenditures mentioned above.

This document includes other reports that Congress requires at the time of the annual report. These are as follows:

- A report identifying the amount and location, by Forest, State, and productivity class, of (1) all lands in the National Forest System where land management plans have indicated the need to reforest areas that have been cut over or otherwise denuded or deforested, and (2) all lands with stands of trees that are not growing at their best potential.
- An estimate of the funds needed to successfully replant an acreage equal to the acreage to be cut over that year.
- A report on the amounts, types, and uses of pesticides used in the National Forest System, including the beneficial or adverse effects of such uses.

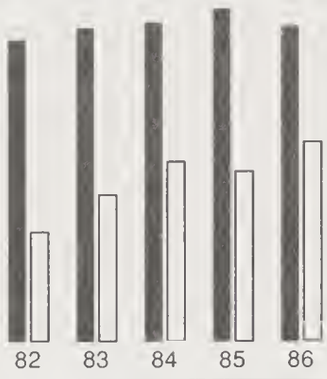
In addition to requirements of the Act, this Report reports on accomplishments and outputs in relation to commitments in the appropriate Forest Service budget.

2/ Unless otherwise stated, all references to years in this report are fiscal years.

Administration

Administration

Expenditures and Receipts

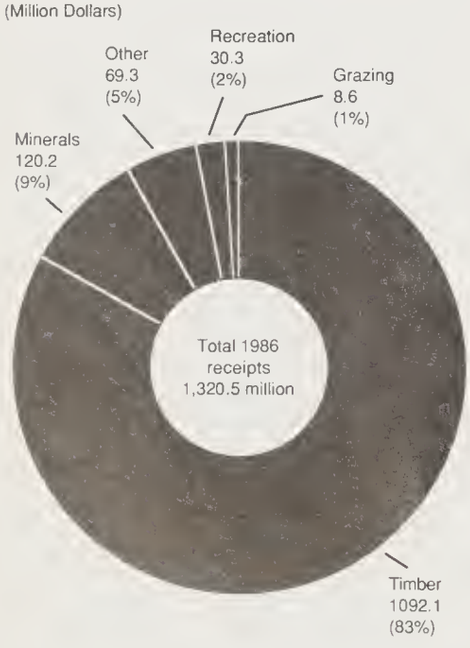


(Million Dollars)

	82	83	84	85	86
Expenditures	1,993	2,061	2,095	2,199	2,078
Receipts	730	966	1,184	1,133	1,321
Receipts as percent of expenditures	36.6%	46.9%	56.5%	51.5%	63.5%

Distribution of Receipts by Program

(Million Dollars)



INTRODUCTION

In 1986, we continued to provide quality service to the public while gaining efficiencies and cost reductions in the many ways services are delivered. Administration also provides quality support to all programs of the Forest Service and at all organizational levels. Specific activities include personnel, fiscal, finance, computer systems, procurement, telecommunications, law enforcement, and property management.

Administration has taken the lead to effect a reduction in staff but maintain an efficient workforce by realignment of organizations, continued efforts in the distributed processing information system, and by conversion of manual processes to automated systems.

RECEIPTS AND EXPENDITURES

The Forest Service receives operating funds from Congress and from various cooperator deposits. Receipts are collected from Forest Service operations such as timber sales, grazing and recreation fees, and mineral leases and permits (tables 1-6).

Receipts for 1986 totaled $1.32 billion, up 14 percent from last year's $1.13 billion. Expenditures totaled $2.08 billion, compared to $2.20 billion in 1985.

Timber receipts in the form of cash, deposits, and roads in lieu of cash totaled $1.09 billion, which made up 83 percent of total Agency revenue in 1986. Receipts from mineral leases, royalties, sales, and bonus bids were the second-largest source of revenue at 9 percent of the total, or $120 million. Other sources included recreation fees, land use permits, grazing fees, and royalties from the sale of Smokey Bear and Woodsy Owl products.

Managing the National Forest System in 1986 required 82.7 percent of all Forest Service expenditures. Forest Research spent 6.1 percent, Human Resource Programs 3.8 percent, and State and Private Forestry 3.2 percent of the budget. Working Capital Fund, used to replace vehicles and heavy equipment, amounted to 4.2 percent of expenditures.

The Forest Service, as required by law, pays the States 25 percent of all National Forest receipts. These funds are to be used for public schools and roads in counties containing National Forest System lands. In 1986, the Forest Service paid $212.2 million to the States from money received from National Forests in 1985. In addition, a total of $15.3 million was paid to counties from National Grasslands and Land Utilization Projects receipts from calendar year 1985. Minnesota received $716,015 under the Boundary Waters Canoe Area Wilderness Act.

PRODUCTIVITY IMPROVEMENT

FY 1986 was the first full year of a Forest Service pilot study in which four field units were granted maximum flexibility within legal bounds to achieve agreed-upon output targets and objectives. Two of the four units were allocated lump-sum budgets with freedom to apply savings to higher priority work. All proposals for simplification of procedures or delegations of authority were generated by the units themselves. Preliminary data indicate an increase in productivity and quality of service to the public on the test units and greater employee enthusiasm. The pilot study will be continued with the expectation that the changes and spirit generated on the test units will be transferred to the entire Forest Service organization, creating a better management climate, higher employee motivation, and overall increased productivity.

The Forest Service continued its emphasis on increasing productivity and reducing costs in 1986. Line managers at all levels have reported significant accomplishments. Some of the greatest savings took place in administrative areas, where 58 staff units have been eliminated since 1983, at a savings of $1.5 million. An additional 19 units were colocated, saving almost $500,000, and 115 units started sharing services with an estimated annual cost savings of $2.6 million. In 1986, field units continued their efforts in colocation, space sharing, and reorganization of offices. The Washington Office started implementation of a realignment plan to reduce staff units from nine to six by the year 1989.

Potentionally high-payoff efforts underway include new automated systems for contracting, procurement, and personnel. In increasing productivity significantly, these innovations will reduce staffing and labor costs.

Managers also began new workforce management-planning efforts. Employee creativity resulted in a variety of cost-reduction actions that should yield savings worth an estimated $12.9 million.

WORKFORCE

Forest Service employees were fewer in number by the end of fiscal year 1986 than in 1985, continuing a trend in reducing personnel over the past several years. To meet budget requirements, a special program allowed 620 people to retire early in FY 86. Peak employment (July) fell from 47,943 to 44,557, predominantly through attrition (table 8). There was also a drop in permanent full-time employment, from 29,211 to 27,419, and a decrease in the permanent "other" category and temporary workforce from 3,713 to 3,017, and from 15,019 to 14,121, respectively.

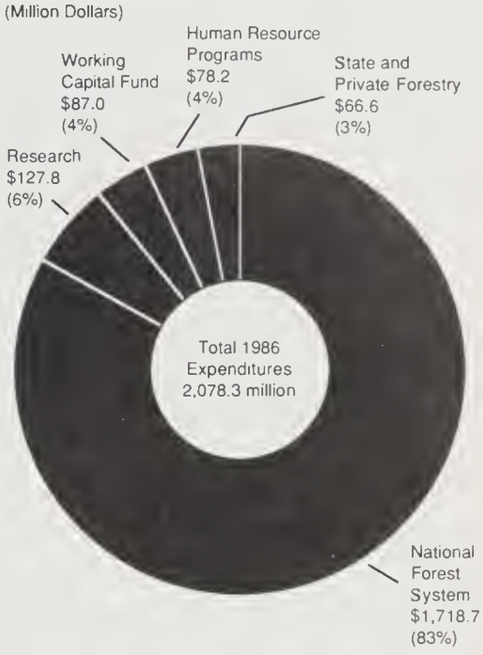
The Agency's workforce is heavily concentrated in the National Forest System, which employs 92.2 percent of our people. Research has 7.3 percent, and State and Private Forestry makes up only 0.5 percent.

Of Forest Service employees, 57.3 percent (24,978) are in technical occupations (table 7); the largest portion of these are forestry technicians. Professional employees are the second-largest category, with 10,354, or 23.7 percent of the Agency's workforce. Foresters and civil engineers remain the largest professional occupations in the Forest Service.

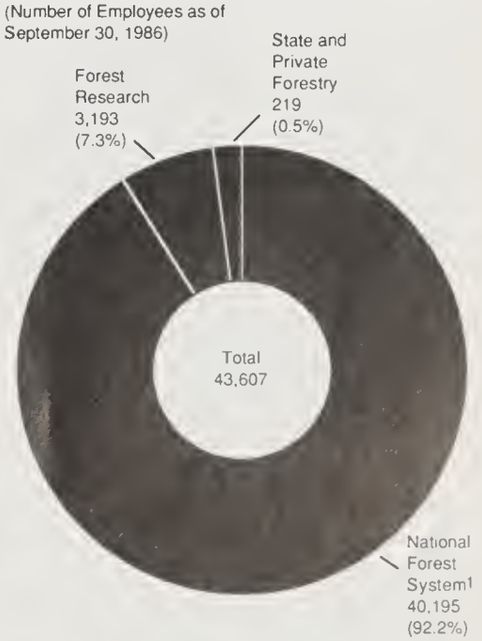
In keeping with the Forest Service goal of a diverse workforce, the organization continued to increase representation of minorities and women. In the permanent workforce alone, women constituted slightly over 30 percent and minorities almost 12 percent of all employees. Together, women and minorities occupied 17 percent of the professional, 55 percent of the administrative, and 35 percent of the technical positions, a slight increase in all categories over 1985.

Minorities and women now serve as Forest Supervisors, Deputy Forest Supervisors, District Rangers, Assistant Station Directors in Research, Project Leaders, Program Managers, Staff Directors, Administrative Officers, Directors and Deputy Directors of Job Corps Centers, and in a variety of mid- and senior-level staff positions.

Distribution of Expenditures by Program Area



Distribution of Workforce by Program Area

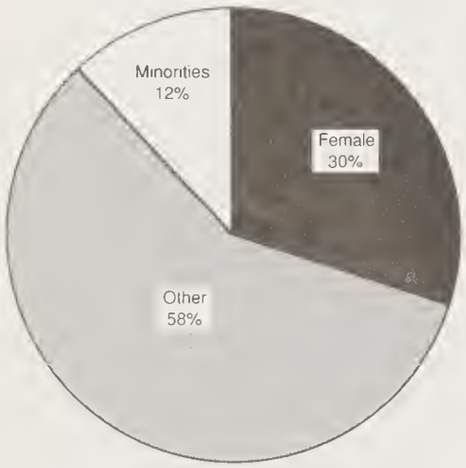


[1]Includes Office of Information, Programs and Legislation, and Administration

Distribution of Workforce by Tour of Duty

	82	83	84	85	86
Total	52.8	51.0	49.2	47.9	44.5
(Thousands of Employees as Reported in July)					
Permanent full time	30.4	30.8	30.0	29.2	27.4
Other permanent	6.8	5.3	4.0	3.7	3.0
Temporary	15.6	14.9	15.2	15.0	14.1

FY 1986 Permanent Workforce Composition



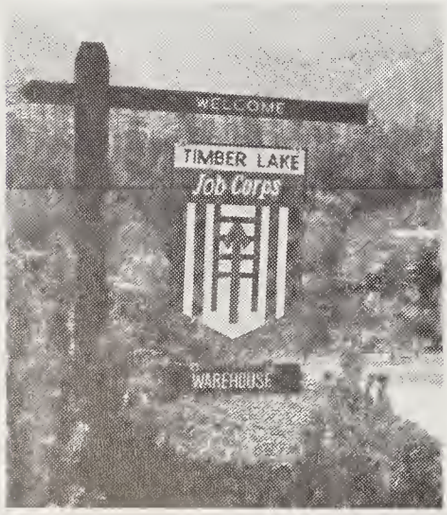
Job Corps Centers provide disadvantaged young people from America's cities a chance to learn important job skills.

An SCSEP enrollee works with scientists studying canker and foliar and root diseases in Christmas trees.

HUMAN RESOURCE PROGRAMS

The goal of the Forest Service's Human Resource Programs is to provide job opportunities and training for youths, the unemployed, underemployed, economically disadvantaged, and the elderly while carrying out high-priority conservation work. During 1986, $78.2 million was transferred from the Department of Labor to operate two major programs: Job Corps and the Senior Community Service Employment Program. In addition, the Agency used $3.5 million of National Forest System funds to operate a Youth Conservation Corps program during the summer. Other programs administered by the Forest Service included the Volunteers in the National Forests and the Touch America Project. Also, the Forest Service provided work opportunities for participants in State and local employment programs.

These programs offered employment and skills training to 75,419 persons during the year. Major accomplishments, valued at $89.3 million, included campground and trail construction, tree planting, fence building, firefighting, timber-stand improvement, clerical support, and construction of office buildings, warehouses, and roads.



Job Corps

The Job Corps program provides basic education and job training to disadvantaged youths between the ages of 16 and 22.

The Forest Service administers 18 Job Corps Civilian Conservation Centers under an interagency agreement with the Department of Labor. The main purpose of the centers is to enable graduates to find productive work, reenter school, or join the military. In 1986, 80 percent of those completing the Job Corps program took one of these career steps.

Funding for the Job Corps program year (July 1, 1985-June 30, 1986) was $56.4 million. The 9,042 youths who participated (52 percent minorities and 9 percent women) accomplished $19.6 million worth of work through 3,790 person-years of on-the-job training.

Senior Community Service Employment Program

The Senior Community Service Employment Program is administered by the Forest Service through an interagency agreement with the Department of Labor. The program, authorized under Title V of the Older Americans Act, is designed to provide (1) part-time employment and supplemental income to the low-income and disadvantaged elderly, (2) training and transition of participants to the regular labor market, and (3) community service to the public.

During the program year (July 1, 1985, to June 30, 1986), 6,156 persons were employed. Of these, 21 percent were minorities and 35 percent were women. Of the participants, 15 percent were later placed in nonsubsidized jobs. Enrollees accomplished 2,829 person-years of work valued at $33.0 million, returning $1.51 for each appropriated dollar. Funding for seniors during this program year was $21.8 million.

Youth Conservation Corps

The Youth Conservation Corps (YCC) is a summer employment program for young men and women aged 15 through 18. YCC enrollees earn and learn while doing conservation work on National Forest System land. The Forest Service operated a $3.5 million program this year. The 2,107 youths who participated (14 percent minorities and 45 percent women) accomplished $4.0 million worth of work, returning $1.14 on each dollar invested.

Volunteers in the National Forests

The volunteer program offers individuals from all walks of life the opportunity to donate their services to help manage the Nation's natural resources. This program continues to grow in popularity as people realize how they can personally help carry out natural resource programs.

The Touch America Project (TAP) is a special volunteer program that gives young people between the ages of 14 and 17 a chance to gain job experience and environmental awareness while working on public lands. Private sector organizations sponsored 6,016 youths in TAP.

In 1986, the volunteer program and the Touch America Project attracted 51,720 participants, who contributed 1,909 person-years of work valued at approximately $23.0 million.

Hosted Programs

The Forest Service provides conservation work opportunities for participants in programs administered primarily by State and local governments. Hosted programs include the Job Training Partnership Act, college work study, vocational work study, and work incentive. During 1986, 6,394 people participated in these programs, accomplishing 775 person-years of work valued at $9.7 million.

Forest volunteer using an alidade for fire detection.

PUBLIC INVOLVEMENT

The Forest Service recognizes that our resource decisions must be shaped by the values and needs of a variety of publics, including commercial forest users, forest-products consumers, recreationists, State and local governments, local residents affected by Forest Service programs, and other U.S. citizens. In an effort to be more responsive to our customers, the public involvement program has grown beyond sending information to publics and collecting their comments. It now includes an array of activities such as content analysis, cooperative problem-solving, issues identification and management, and conflict resolution.

Public involvement on the Forest Service/BLM Interchange proposal continued through development of a Legislative Environmental Impact Statement--8,000 copies were distributed--and submission of the proposed Federal Lands Administration Act of 1986 was made to Congress in February.

Other major proposals that had significant public review were the draft Timber Sale Program Information Reporting System, the draft Vegetative Management Environmental Impact Statement for the Pacific Southwest Region (with over 4,700 letters from the public), and the draft Spotted Owl Management Plan Environmental Impact Statement for the Pacific Northwest Region (with over 30,000 letters from the public to date).

PROCUREMENT AND PROPERTY

With the need to deliver services to the public and to care for the land more efficiently, we have adjusted our contracting and procurement activities to meet this need. In 1986, procurement and property personnel spent approximately $425 million, which represents about 25 percent of the Forest Service budget. This was accomplished by issuing over 5,400 new contracts, as well as making over 835,000 separate purchasing transactions. To make these purchases, awards of $13 million were made to businesses certified as disadvantaged by the Small Business Administration under the 8(a) program, $10.1 million to other minority firms, and $13.5 million to women-owned businesses. Procurement and property personnel also managed the leasing of 16,083,000 square feet of space (including both Agency-owned and -leased and GSA-controlled space) and managed the acquisition, utilization, and disposal of personal property worth over $700 million, including property on loan to State forestry departments.

In addition, the design and layout contract was awarded for the renovation of our new headquarters in the Auditor's Building. This project should be completed in 1989, at which time all Forest Service offices in the Washington, DC, area will be housed under one roof.

INFORMATION MANAGEMENT

Like most large organizations, the Forest Service is finding that information management—assembling, storing, manipulating, and transferring information--is increasingly critical to successful operation. Day-to-day decisions, as well as long-range planning, depend on the right information being available at the right time, at the right place, and in the right form.

The Agency's continuing emphasis on strong management and administrative efficiency has led to major studies and resulted in the reorganization of paperwork management, computing, and information management functions. The demand for computer applications and services has mushroomed as the Agency carries out comprehensive resource management planning mandated by legislation passed in the 1970's. The need to integrate short- and long-range resource management plans with annual budgeting has been a major stimulus to plan for and manage information systems. The goal is cost-effective use of equipment and software to support the different nature and mix of work at each organizational level, including data processing at the local level. A high proportion of the work at both Forest and Ranger District offices consists of data analysis and manipulation.

The Forest Service is in the fourth year of installing a system of distributed information processing throughout the Agency, bringing the nationwide system up to 78-percent operational. We are on schedule with our goal to provide field offices with common word processing, data processing, and telecommunications capabilities by the end of FY 1987. This year, we added graphics capabilities with the procurement of graphics software and terminals. Printing and graphics have also been upgraded by adding laser printers. We expanded our data management capabilities with the purchase of other new software. We have also initiated the use of satellite data communications technology to help defray rising costs. The long-term savings are expected to exceed $1 million per year in the communications area.

In 1986, the Forest Service established a new scientific and technical information service, FS INFO (Forest Service INformation Forestry Online), to help employees conduct research and keep current in their professional disciplines. Cooperators also will be able to access the online publications file, representing some 40,000 citations initially. An expanded service network of all field libraries will help users find needed information.

MANAGEMENT SCIENCES STAFF

The Management Sciences Staff serves as internal consultant focusing on studies of mathematical, social, business and physical science theories in an effort to improve on specific management activities. Examples of studies completed in 1986 follow.

More Efficient Aircraft Dispatching

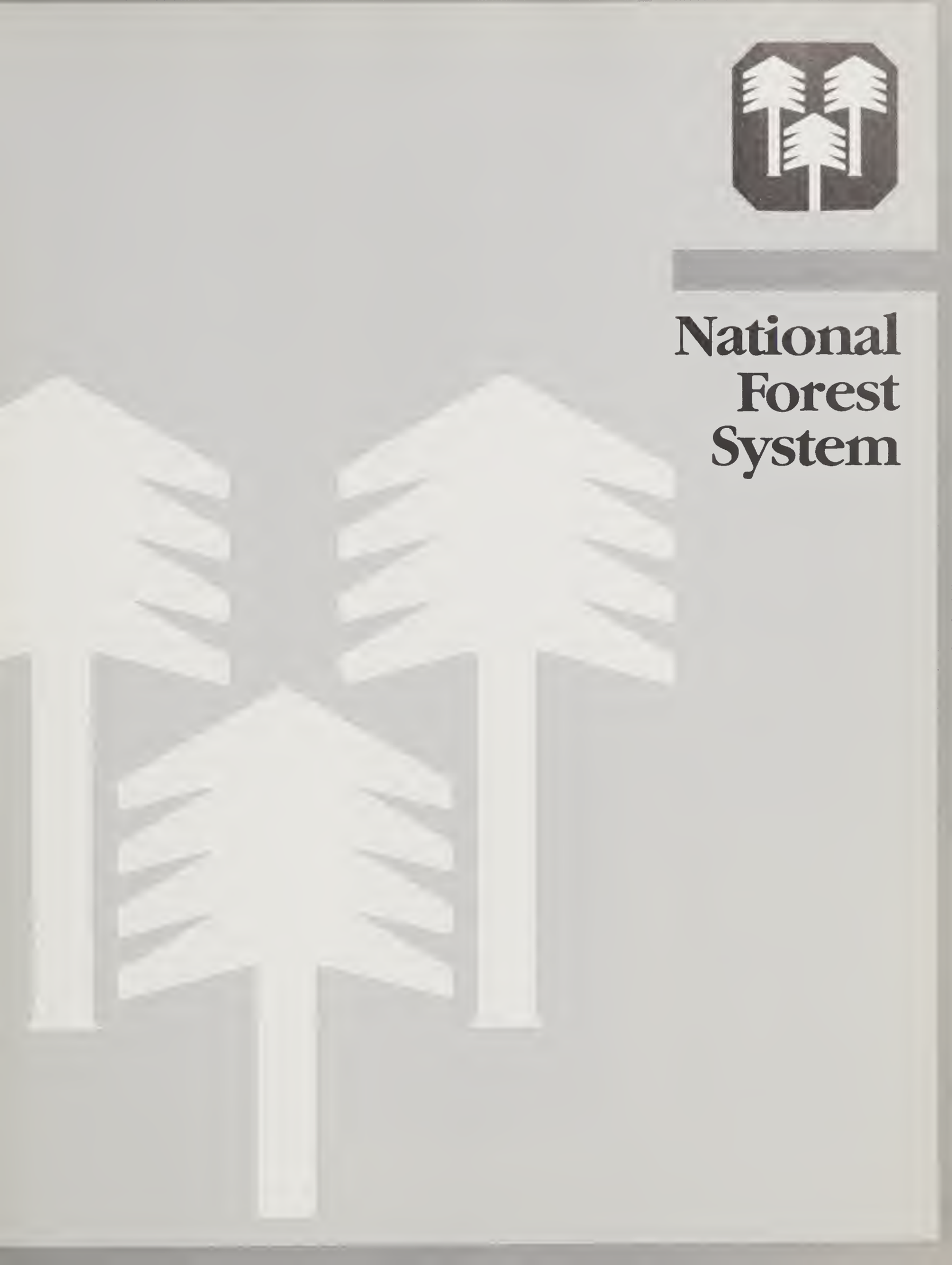
As a part of the Forest Service's emphasis on improving program efficiency, the Management Sciences Staff in Berkeley, CA, has developed a computer system to aid dispatchers in selecting and routing aircraft. Current routing is done manually and is time consuming under stressful conditions. The new computer "dispatch" system saves administrative costs and increases efficiency by providing information on aircraft availability, shortest routes, and lowest cost alternatives to get personnel and equipment where needed.

Ensuring Accurate Payment for Timber Purchases

In the Northern and the Pacific Regions of the Forest Service, the volume of sold timber is established by log scaling, which involves actual measurements such as the length and diameter of logs and judgmental factors concerning the amount and type of defect present within the log. Accurate scaling protects the Government and the purchaser from substantial monetary losses. At present, the quality of the scaling process is evaluated by infrequent rescaling of previously scaled logs by check scalers. This procedure is inadequate to assure consistently accurate scaling. A Continuous Statistical Scaler Profile (CSSP) program has been developed in cooperation with Regions and private log-scaling and -grading bureaus and is intended to improve the quality of log scaling by consistent monitoring of the scaling process.

The Forest Service is testing the CSSP program in cooperation with scaling bureaus in Oregon and California. When fully implemented, the CSSP system will improve the quality of log scaling by detecting systematic scaler bias, and thus protect the government from monetary losses due to incorrect timber volume assessments. It will also reduce the cost of check scaling by concentrating this activity where most needed.

Scaling purchased logs in a Sierra millyard.



National Forest System

National Forest System

INTRODUCTION

The Forest Service manages and protects 191 million acres of National Forest System (NFS) land, 87 percent of which is in the Western United States. Multiple resources are managed on about 159 million acres; wilderness values are managed and protected on the remaining 32 million acres.

The natural resources on these lands are among the Nation's greatest assets. How these resources are used and protected affects the economic, environmental, and social well-being of every citizen. National Forests are the source of many renewable resources such as recreation opportunities, forage, wood, wilderness, wildlife, fish, and water. Nonrenewable resources such as oil, gas, coal, sand, gravel, and hardrock minerals are also provided.

Through the Agency's land management plans, the many resources of the National Forests are managed in an integrated manner. The following discussions focus on the key resource components, outputs, and program activities that together represent the implementation of land management plans.

LAND MANAGEMENT PLANNING

The Planning Process

The Forest Service uses the land management planning process to determine the best use of all resources on NFS land, including recreation, fish and wildlife habitat, water, timber, minerals, range, and wilderness. The process not only helps managers determine the best use of these resources but also helps them respond to demands consistent with approved plans so that adequate supplies are always available.

As part of the planning process, regional guides were developed by each of the nine Forest Service Regions. Managers on individual Forests are using the guides in developing forest plans. These forest plans describe how all resources on that Forest are to be managed, the benefits derived from management, how much management will cost, and what the environmental impact of planned activities will be. Forest plans are designed to achieve these objectives in the most cost-efficient manner.

Land management planning is a continuing process that responds to changes in the demands made upon the supply of renewable resources. The Forest Service, in cooperation with the public, will update and amend forest plans as needed to ensure that adequate resources will be available for future generations.

The Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended by the National Forest Management Act of 1976 (NFMA), requires the Secretary of Agriculture to develop an integrated land and resource management plan for each administrative unit of the National Forest System. To implement the requirements of the NFMA, regulations were developed to guide land and resource management planning on 191 million acres of the National Forest System. The regulations require integrated planning for all resources.

The NFMA regulations were revised in 1983 in response to a court decision that found the 1979 Roadless Area Review and Evaluation (RARE II) environmental impact statement and associated procedures to be inadequate under the National Environmental Policy Act (NEPA). This latest revision mandates that the forest planning process reevaluate areas that remain essentially roadless and undeveloped and have not been designated by law as wilderness or for nonwilderness uses. This revision became effective October 7, 1983.

Regional Guides

All nine final regional guides and environmental impact statements required by NFMA have been published. The primary purpose of these guides is to provide national and regional direction in the development of forest plans. Included in the guides are major issues and management concerns of the Region as well as tentative resource objectives, recommended by RPA, for each National Forest. While the guide ensures that a consistent approach to National Forest planning is followed throughout the Region, it allows management on the individual Forests considerable latitude in formulating forest plans. The guide also helps coordinate NFS programs in the Regions with programs in State and Private Forestry and Research.

Status of Forest Plans

Of the 123 Forest plans to be developed under the NFMA, 65 final and 54 draft Forest plans have been filed with the Environmental Protection Agency or approved for publication.

Table 14 lists the draft and final Forest plan environmental impact statements (EIS's).

Status of Appeals

Approximately 280 appeals were filed, of which 71 were resolved through the land management planning process. Twelve Forest plans have been cleared of all appeals.

The Pacific Northwest Regional Guide is the only Regional Guide that has been appealed. The Guide was remanded by the Secretary's office, requiring additional analysis and preparation of a supplement to the Guide to determine the amount of old-growth timber that must be protected to assure viability of the northern spotted owl. The draft supplement was published in August, 1986.

Draft Forest plans, where spotted owl is a significant issue, were not released to the public until the spotted owl evaluation was completed.

Wilderness Legislation

At the beginning of calendar year 1986 there were 32.4 million acres of wilderness in the National Forest System. Another 21.6 million acres of roadless areas are being reviewed for their wilderness potential. The latter figure includes congressionally mandated wilderness studies on about 6 million acres in 26 States.

At the end of the 99th Congress, 20 wilderness bills had been considered by Congress for 9 States. Eleven new wilderness areas and six wilderness additions had been passed by Congress covering 98,464 acres in five States.

Wild and Scenic Rivers

Legislation passed by the 99th Congress designated 139 miles of additional rivers to the National Wild and Scenic Rivers System. Included are the Cache la Poudre in Colorado (76 miles), the Saline Bayou in Louisiana (19 miles), the Black Creek in Mississippi (21 miles), the Horsepasture in North Carolina (4 miles), and the Klickitat (10 miles) and White Salmon (9 miles) in Washington.

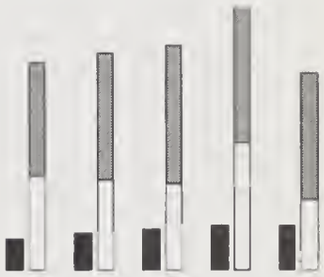
The total National Wild and Scenic Rivers System now includes 71 rivers and 7,357 miles, of which the Forest Service manages 29 rivers with 2,239 miles.

Two additional river studies were mandated by the 99th Congress. These will consider additional miles of the Klickitat (30 miles) and the White Salmon (20 miles), both in Washington. Other congressionally mandated river studies are continuing on the Sipsey Fork in Alabama, Red River in Kentucky, Greenbrier in West Virginia, Allegheny in Pennsylvania, and the North Umpqua in Oregon.

Through the land management planning process, the eligibility of about 500 rivers that flow through the National Forests continues to be evaluated. Many of these rivers were identified as having outstanding values in the National Rivers Inventory (National Park Service 1982). Some National Forests are making Wild and Scenic Rivers suitability determinations in the Forest plans, while others have deferred further study until plan completion.

The Mount Hood National Forest, in Oregon.

Minerals—Funding and Receipts



(Million Dollars)

	82	83	84	85	86
Funding	18 7	22 6	25.7	26 6	27 1
Receipts collected through U S.D I	68.6	77 6	84 8	81 9	77 3
Receipts reported by the F S.	57 9	54 9	51.6	77.5[1]	42 9
Funding as percent of receipts	14.8	17 1	18 8	16 7	22 5

[1]See table 3, footnote 1

MINERALS

Energy-producing resources found beneath NFS lands include oil, natural gas, coal, geothermal steam, and uranium. Minerals of strategic importance beneath NFS lands include chromium, nickel, tungsten, and molybdenum. Gold, copper, zinc, silver, and phosphate are also found in significant amounts.

Energy and mineral resource management within the NFS is jointly shared between the Secretaries of Agriculture and the Interior. Forest Service minerals management ensures that the mineral resource programs and activities are integrated with the management of other resources. The Forest Service has entered into interagency agreements with Department of the Interior agencies to establish cooperation and coordination in the management of federally owned minerals with the NFS.

Nearly 26,650 mineral cases were processed in 1986, exceeding the 1986 RPA recommended level by 11 percent, and the funded target by 16 percent (table 15). These cases involved leasable, locatable, and common variety minerals. They included such activities as processing new lease applications, completing validity examinations, processing prospecting permits, administering operating plans, and working on reserved and outstanding minerals rights. The funded minerals caseload target represents an estimate of the anticipated workload. The workload tends to fluctuate as market conditions and mineral demands change.

More minerals cases were submitted than were anticipated for fiscal year 1986. Some of the increase in the minerals management work was the result of leases being turned back and reoffered due to the changed oil market. Activities related to gold and platinum-group metals continued to increase in FY 1986. Although accomplishments exceeded the RPA and funded targets, the number of cases remaining unprocessed at the end of the year decreased from 3,533 in 1985 to an estimated 2,363 in 1986 (table 16).

Of the unprocessed cases, 1,055, or 45 percent, were cases in areas where the Forest Service is precluded from acting upon them. In particular, these include areas being considered for wilderness and restricted under the Appropriations Act or where wilderness studies are not yet complete.

The mineral withdrawal review required by the Federal Land Policy and Management Act of 1976, Section 204(1) (43 U.S.C. 1714), is about 40 percent complete. This review involves 1,980,000 acres of National Forest System lands. There are 1,681 separate withdrawals that affect 6,150 individual sites. The Forest Service review will be completed in 1989 and will be incorporated into the Secretary of the Interior's report to the President, which is scheduled for 1991.

In 1986, total receipts from rents, royalties, sales, and bonus bids for minerals totaled an estimated $120.2 million. Total receipts of $120.2 million are about $20 million less than Fiscal 1985 receipts (adjusted for the windfall profit tax payment).

Program costs have increased in recent years, compared to the receipts generated. Only a small part of the fiscal year 1986 receipts are the direct result of program activities conducted in the same year. An estimated 90 percent of the fiscal year 1986 receipts result from work done in prior years. Similarly, much of the program conducted during 1986 will lead to receipts in future years. The costs-receipts relationship has also been influenced by increased costs associated with resource coordination activities and a cyclical downturn in many mineral markets.

LANDS

Land Exchange

Land exchanges are carried out primarily to reduce the cost or improve the effectiveness of resource management. In 1986, 133,300 acres of non-Federal land were acquired in exchange for 101,614 acres of NFS land. Due to their complexity, land exchanges often take more than 1 year to complete. However, in 1986, as a result of completing several large acreage exchanges sooner than anticipated, over 100 percent of the planned land exchanges were completed.

These exchanges consolidated NFS lands, making it more efficient to manage and administer various resource programs. For example, these land exchanges served to reduce National Forest property lines by more than 1,800 miles in 1986. This will provide estimated savings of approximately $10 million in future landline location costs, or nearly twice the $5.2 million cost of the exchange work. Additional savings will result from fewer trespass cases, fewer special-use permits, and fewer rights-of-way cases in future years.

Much of the non-Federal land acquired through land exchanges is within classified Wilderness Areas, National Recreation Areas, Wild and Scenic Rivers, National Trails, and other congressionally designated areas. In each case, it was more cost effective to exchange lands than to purchase them. In 1986, non-Federal landowners paid $572,900 in cash equalization payments, and the United States paid $542,000. The total amount ($1,114,900) was less than 2 percent of the appraised land value.

Landline Location

Landlines--the legal boundaries between NFS lands and other ownerships--must be identified so that activities (e.g., timber sales) can be carried out without risk of trespass.

Accurate location of Forest Service property lines is essential for managing and protecting NFS lands from encroachment. The RPA recommended level is to locate, mark, and post all NFS property boundaries by the year 2020. Of the total 272,409 miles of NFS property boundary, 80,171 miles were completed by the end of 1986.

In 1986, $27.2 million was appropriated to locate about 4,422 miles of property boundaries. A total of 4,825 miles was located, 9 percent more than the target. The Forest Service was able to exceed planned targets primarily because of efficiencies gained through advancements in technology and procedure.

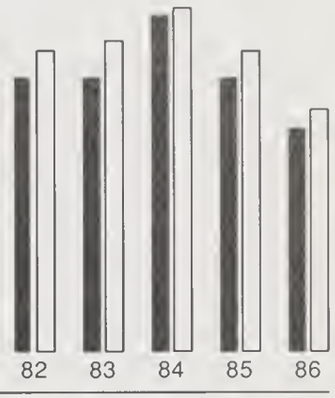
Small Tracts Act Cases

The Small Tracts Act of 1983 authorizes the Secretary of Agriculture to sell or exchange certain small parcels of NFS land. Included are unmanageable parcels of various sizes and shapes located between mineral patents and small parcels innocently occupied (e.g., where a private home has been inadvertently built over an NFS property line). Since February 1984, when regulations to implement the Act became effective, 452 cases, most involving encroachments, have been resolved. In all, 469 acres of Federal land have been conveyed, 498 acres of non-Federal land have been acquired in interchanges, and $458,299 has been paid to the United States. Of the 452 cases, 194 were resolved in 1986.

Land Purchase and Donations

The Forest Service purchased 43,165 acres of land and interests in land with money provided by the Land and Water Conservation Fund and Receipts Acts appropriations. In addition, landowners donated 1,383 acres of land and interest in land to the National Forest System.

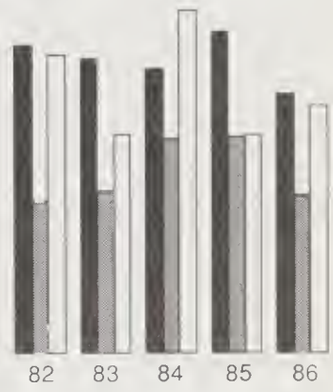
Landline Location



(Thousand Miles)

	82	83	84	85	86
Funded	5.4	5.4	6.6	5.4	4.4
Accomplished	5.9	6.1	6.8	5.9	4.8

Land Exchange Funding and Accomplishment



	82	83	84	85	86
Million dollars appropriated	6.2	5.9	5.7	6.5	5.2
Thousand acres funded	82.6	87.9	116.0	117.2	85.1
Thousand acres accomplished	161.5	118.6	185.8	119.0	133.3

PROTECTION

Law Enforcement

Forest Service responsibility for law enforcement is directed at protecting natural resources, Federal property, employees, and visitors on the National Forests. Major law enforcement investigative activities in 1986 covered wildland arson, timber theft, marijuana eradication, internal investigations, theft of artifacts, and destruction of archeological sites.

The Forest Service participated with the Federal Drug Enforcement Administration (DEA), U.S. Department of Justice, and State and local agencies in the detection and eradication of illegally cultivated cannabis (marijuana). A total of 260,000 cannabis plantings were removed from National Forest System lands. The major concern with cannabis is the risk to National Forest visitors, contractors, and employees when they encounter those who are tending and/or guarding these lucrative crops. Reducing the use of the National Forests for cannabis production is essential to maintain a safe environment for all users of the National Forest System.

The loss of cultural resources to vandalism, pothunting, illegal digging, and theft is still of great concern on National Forest System lands. The Forest Service has been investigating and prosecuting pothunting cases since the mid-1970's. Special agents and law enforcement officers have been directly involved with many convictions under the Archaeological Resources Protection Act (ARPA) in several States. During 1986, Forest Service officers participated in a Utah Interagency Task Force for the protection of archeological resources. Over 300 items of archeological significance were returned to the U.S. Government, including 14 baskets valued at $250,000. Illegal digging activity in the southern Utah area was reduced from over 300 violations in 1984 to no known activity in 1986.

Booby traps, hand grenades, homemade pipe bombs, incendiary bullet devices designed to detonate when a vehicle tire passes over them--these are just a few of the threatening objects the Forest Service found in 1986 at marijuana-growing spots on National Forests.

A Forest Service law enforcement officer and local sheriff's deputy destroy marijuana plants after removing them from a secluded growing plot on National Forest System lands in California.

The Cooperative Law Enforcement Program is designed to compensate local law enforcement agencies for protecting visitors and their property in National Forests. Funding has been concentrated where large numbers of visitors must receive their principal protection from relatively small, understaffed local law enforcement agencies. Reductions in crime continue to be achieved in National Forest locations where this program has increased the law enforcement presence.

TIMBER

Program Overview

A significant portion of the timber on National Forest System lands is managed to produce a continuous supply of wood products to help meet America's needs. The products of the National Forest timber resource include logs for lumber and plywood, wood fiber for paper, fuelwood, posts, poles, and Christmas trees.

National Forests have the largest inventory of standing sawtimber in the Nation, estimated at nearly 1.1 trillion board feet. This is about 41 percent of the national total. Nonindustrial private forest lands account for 33 percent of the total; private industry has 15 percent; and other public lands have 11 percent.

National Forests provide about 15 percent of the total wood volume annually harvested in the United States. This compares to about 48 percent from nonindustrial private forest lands, 30 percent from lands owned by the forest industry, and 7 percent from other public lands.

Accomplishments for the three major timber program components in relation to 1986 targets were 103 percent for timber offered for sale, 110 percent for reforestation, and 113 percent for timber-stand improvement (TSI). The targets were exceeded in reforestation and TSI primarily as a result of greater use of natural regeneration techniques and reduced contracting costs.

Accomplishments in comparison with the recommended levels established in the 1985 RPA program were: 91 percent for timber offered, 84 percent for reforestation, and 98 percent for timber-stand improvement.

Demand in 1986

Demand for timber products in the United States rose significantly from 1985 levels, especially for softwood products. This increased demand resulted in the highest harvest of National Forest timber since 1973.

Timber Sale Preparation, Offering, and Harvest

The timber sale program goal for fiscal year 1986, as directed by Congress, was to prepare and offer 11.4 billion board feet (BBF) for sale. The congressional direction also specified that the Forest Service should continue to offer at least 4.6 BBF of net merchantable sawtimber in the Pacific Northwest Region (Region 6).

During 1986, a total of 11.7 BBF were actually prepared and offered, and 11.0 BBF were sold. The value of timber sold was $757 million. These figures compare to 1985 sales of 10.8 BBF valued at $558 million. The average bid for timber in 1986 was $69 per thousand board feet. This compares with $52 in 1985, $66 in 1984, and $70 in 1983 (table 21). In part, the increase in average bid over the past year reflects the upturn in timber demand.

In 1986, timber such as these logs from the Sequoia National Forest in California brought $757 million into the Treasury--almost exactly $200 million more than sales garnered in FY 1985.

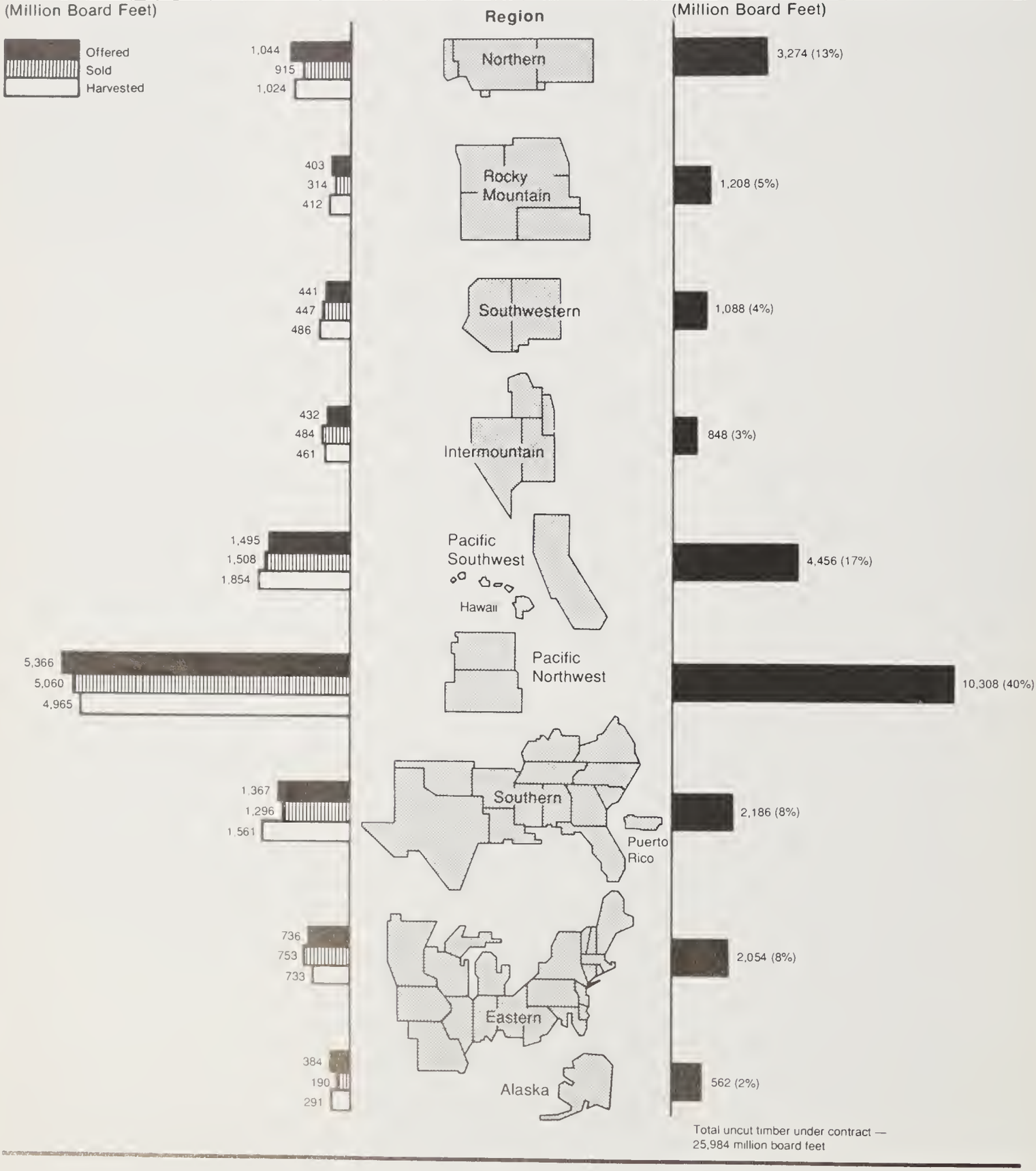
Timber Offered, Sold, and Harvested

(Billion Board Feet)

	82	83	84	85	86
Offered	11.1	11.3	11.9	11.5	11.7
Sold	10.0	11.1	10.7	10.8	11.0
Harvested	6.7	9.2	10.5	10.9	11.8

Timber Offered, Sold and Harvested

Uncut Timber Volume Under Contract



Total uncut timber under contract — 25,984 million board feet

The cost, per thousand board feet, to prepare and administer timber sales was less in 1986 than in 1985. This cost reduction resulted from the inclusion in 1986 of 3.2 BBF of reoffer volume. This is timber returned to the Government from both buy-back sales, under the Federal Timber Contract Payment Modification Act (FTCPMA) of 1984, and defaulted sales. Reoffering the buy-back and defaulted sales required only part of the normal timber-sale-preparation work in FY 1986.

The 1986 harvest volume totaled 11.8 BBF, compared to 10.9 BBF in 1985. Value of timber harvested was $787 million in 1986, compared to $720 million in 1985.

Uncut volume under contract decreased to 25.98 BBF in 1986, compared to 38.1 BBF in 1985. Volume under contract includes sales conditionally extended as well as volume from unresolved defaulted sales. It also includes some sales whose status remains unresolved during Title 7 bankruptcy proceedings. Long-term sale volume is included in the total as it is released for cutting.

The reduction in volume under contract reflects the 9.75 BBF of timber sales returned to the Government under the provisions of FTCPMA. This Act provided an opportunity for many companies that purchased Federal timber before January 1, 1982, to turn back contracts upon payment of a buy-out charge. Return of the contracts occurred in fiscal year 1986. Total value of contracts returned under this Act was approximately $3 billion. Buy-out charges returned to the Government were $170.2 million.

Most purchasers were unable to turn back contracts for all of their high-priced timber sales. Contractual obligations exist to harvest the remainder of these sales. The multisale extension program did allow participating purchasers to delay harvest of sales included in the program, but some timber purchasers still face a difficult economic situation in harvesting these sales. In 1986, there were defaults on over 1.6 BBF of timber sales because purchasers could not operate these sales at a profit. The Forest Service is required to reoffer these sales at current market prices in order to determine the amount of damages, if any, owed to the Government. Almost 900 million board feet of defaulted timber were reoffered in FY 1986.

Salvage Sale Program

This program was authorized under the National Forest Management Act of 1976. It allows the Forest Service to use money from salvage sales to cover the cost of preparing and administering the sale of insect-infested, dead, damaged, or downed timber, and engineering work necessary for roads.

Approximately 830 million board feet of salvageable timber were sold in 1986 through the salvage sale fund. This represents about 50 percent of the salvage volume sold. Small timber operators with fewer than 25 employees purchased about 10 percent of salvage sale fund volume.

Major sale offerings have involved timber killed by the southern pine beetle epidemic in Texas, Louisiana, and other Southern States during the last 2 to 3 years; by the mountain pine beetle throughout the central and northern Rocky Mountain area; by blowdown in Idaho; and timber damaged by fire in the South and West. This timber generally sells for a substantially lower price than green timber and provides a source of inexpensive timber for small size-class purchasers.

Fuelwood

The amount of firewood removed from National Forest System lands continued the decline begun in 1982. In 1986, the equivalent of 2.0 million cords of fuelwood were sold or provided for free use, compared to 2.4 million cords in 1985, 2.7 million in 1984, 3.4 million in 1983, and 5.1 million in 1982.

The reported decline reflects both decreasing demand due to lower prices for oil and gas and initiation of a permit program, including charges for firewood, in place of the free-use program.

Summary of Timber Sale Buy-Out
Returned and Reoffered Volume

Region	No. of Sales	Total Volume Returned (MMBF)	Total Buy-Out Charges Billed ($ thousands)	Volume Reoffered in FY 1986 (MMBF)
1	112	665	9,108	132
2	13	33	328	5
3	26	166	1,758	16
4	17	40	464	2
5	226	1,997	43,009	293
6	991	6,627	112,718	1,798
8	136	202	2,607	69
9	57	18	185	4
10	0	0	0	0
Total	1,578	9,748	170,177	2,319

HOW VALUES ARE CALCULATED

Value of Timber Products Sold

The value of timber products sold is an estimate of the amount the Forest Service expects to receive from the timber sale, based on the bid rates. It does not include purchaser credit--the value of permanent roads built by purchasers. It includes all types of sales, products, and tree species.

Value of Timber Products Harvested

The value of timber products harvested is the adjusted amount paid by the purchaser at the time of harvest. The value does not include purchaser credit. The value of timber harvested from a sale may differ from the bid value because of price adjustment provisions in the contract and differences between estimated and actual volumes.

Money Received From Timber Products

Money that the Forest Service receives from the sale of timber products varies from reported harvest value due to the time delay between billing and receipt of payment.

The use of firewood as an alternate source of heating will continue; however, the recreational values associated with it may soon predominate. The sale of fuelwood from National Forests has increased revenues to the Treasury from $85,000 in 1981 to $5.09 million in 1986.

Timber Sale Cost and Value Comparison

Recent congressional and public interest in the Forest Service timber sales program has centered on concerns that the cost of selling some timber exceeds the direct monetary return to the Treasury from the sale. In responding to these concerns, the Forest Service has emphasized that the real measure of a timber sale program's worth is its costs versus public benefits, not costs versus revenues. Public benefits are both monetary (such as revenues) and nonmonetary (including improvements to other resources, such as recreation and wildlife). It is difficult and sometimes impossible to assign a value to some nonmonetary benefits.

Silvicultural Examinations

Data from silvicultural examinations are used to develop site-specific prescriptions to meet multiple-use objectives. Silvicultural examinations also provide essential basic timber data for the implementation of the Forest land management plans. In 1986, 4.2 million acres were examined in this program.

Reforestation

About 364,000 acres of National Forest land were reforested in 1986. Of this total, 149,000 acres were reforested using appropriated and Reforestation Trust funds, while 215,000 acres were funded by money set aside from timber sales under the Knutson-Vandenberg Act (K-V) (tables 28-30).

At the close of 1986, about 848,000 acres needed reforesting. This is a normal level of treatment needs, since the average time delay between reforestation need and actual reforestation treatment is 2 to 3 years. The total includes approximately 430,000 acres of new treatment needs resulting from timber harvest, fires, insects, diseases, windstorms, and unsuccessful reforestation treatments during the past year. The declining southern pine beetle epidemic added only about 7,000 acres to 1986 reforestation needs, compared to nearly 33,000 acres in 1985. However, on a national basis, deforestation due to insects and diseases in 1986 still occurred on over 13,000 acres, which is nearly double the normal average.

An average of 86 percent of all reforestation treatments have successfully met stocking objectives over the last 5 years. In 1985 (the latest data available), success was 86 percent. This was about 4 percent below the previous year due to the severe drought in the Southern States and portions of the Intermountain West.

The average cost of all reforestation in 1986 was about $326 per acre (appropriated $346 and K-V $312). The 1986 cost was about 6 percent less than in 1985 due to the completion of the backlog reforestation acres in 1985 and an increase in 1986 of the use of natural regeneration methods where this was technically feasible (table 28).

Timber-Stand Improvement

Timber-stand improvement (TSI) includes several types of noncommercial stand treatments designed to improve stand growth or quality. The future usable yield of timber stands can be increased anywhere from 15 to 25 percent with treatments such as thinning overly dense stands, eliminating competing shrubs or weed trees ("release"), or applying fertilizer to stimulate tree growth. As of October 1, 1986, TSI treatment has been prescribed for about 1.4

million acres. This includes reforested stands that may need thinning or release to maintain a healthy, vigorous condition.

A total of 360,000 acres received TSI treatment. Various appropriated funds were used to treat 259,000 acres; K-V funds were used on an additional 101,000 acres (tables 31-33).

The average cost of all TSI in 1986 was about $133 per acre, an increase of 6 percent from 1985. In part, costs were higher because of the substitution of higher cost manual release methods where the use of herbicides was restricted. The cost of TSI funded by K-V increased 17 percent, up to $187 per acre, for this reason. Many K-V projects were delayed where manual release techniques were not suitable or too costly.

Tables 29 through 35 provide detailed information on needs, accomplishments, and the certification of reforestation and TSI.

Forest Tree Improvement

The tree improvement program is designed to select trees with superior growth or disease-resistance characteristics as breeding stock to produce seed for improved seedlings for the Forest Service planting program. Timber yields should be at least 10 percent greater on lands reforested with genetically improved planting stock. During 1986, 40 percent of the acres artificially regenerated were planted with seedlings grown from seed orchard seed.

More than 1,600 superior trees were selected, 877 acres of seedling tests were planted to evaluate the genetic worth of the selections, and 144 acres of seed orchards were established to produce improved tree seed. Over 13,000 pounds of seed were harvested in seed orchards this year, accounting for 23 percent of the total amount of seed collected

Inventory and Planning

Timber inventory is the collection of basic timber resource information. The information is used in the development of Forest land management plans under the National Forest Management Act planning process and in the RPA assessment. The Forest Service annually inventories approximately 10 percent of its forested land base for timber information. New allowable sale quantities (volume of timber that may be sold for harvest) and supporting timber management activities for the next 10 to 15 years are being established for each of 123 National Forest units. The allowable sale quantities in the Forest plans (final and draft) issued to date indicate a slight increase over the volume of timber sold in recent years from these Forests. However, a final and total comparison cannot be made until all Forest plans are complete, sometime in 1987.

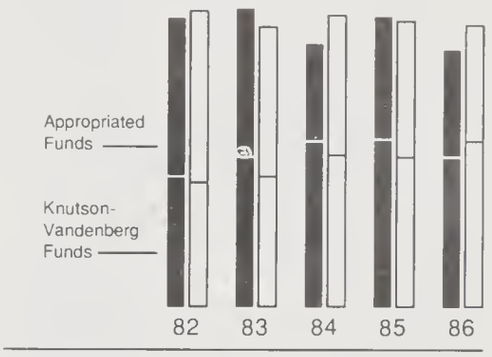
The Heli-Stat Project

The Heli-Stat was envisioned to be a revolutionary new type of aircraft composed of four helicopters connected to a helium-filled airship. The Heli-Stat was approved for flight in May 1986. Several successful test flights, with over 20 hours of flight time, were made during May and June, 1986. However, an accident on July 1, 1986, resulted in the loss of the vehicle.

Though the accident has prevented completing the project as envisioned, several benefits from the project accrued. These include confirmation that the original concept is workable, a new computer simulation model for use in Forest planning and the design of logging systems, a new heat treatment for increasing the strength of structural members, a new piece of equipment for bunching logs on steep slopes, a new method to estimate log weights to increase the payload efficiency of cable and helicopter operations, and other improvements to current technology.

Reforestation

	82	83	84	85	86
Total Funded	373.0	384.3	339.0	373 6	331.2
Total Accomplished	382.8	361.7	376.0	369.8	364.0

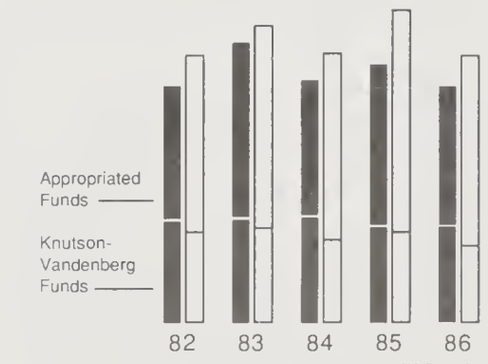


(Thousand Acres)

	82	83	84	85	86
Funded					
Appropriated	206.0	191.0	124.0	157.6	138.7
K-V	167.0	193.3	215.0	216.0	192.5
Accomplished					
Appropriated	221.6	193.2	180.7	175.2	148.9
K-V	161.2	168.5	195.3	194.6	215.1

Timber-Stand Improvement

	82	83	84	85	86
Total Funded	317.0	374.7	323.7	346.4	319.3
Total Accomplished	361.0	397.6	361.6	421.4	360.1

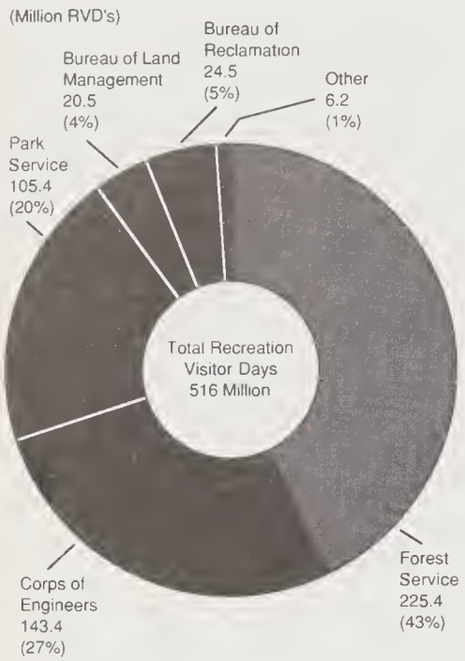


(Thousand Acres)

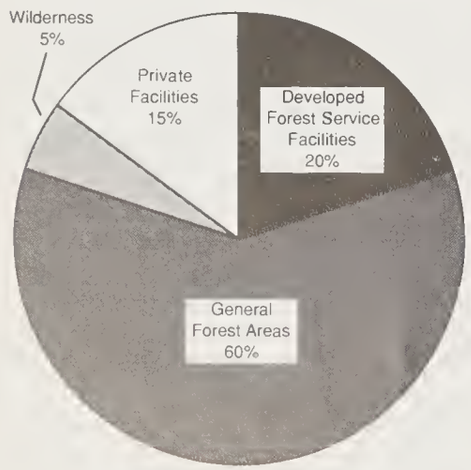
	82	83	84	85	86
Funded					
Appropriated	180.0	235.0	181.7	214.4	188.4
K-V	137.0	139.7	142.0	132.0	130.9
Accomplished					
Appropriated	240.2	270.6[1]	250 1	300.5	259 4
K-V	120.8	127.0	111.5	120.9	100.7

[1] Does not include 158,000 acres accomplished with Federal Emergency Jobs Bill funds.

1985 Recreational Visitor Days by Federal Agency



Where Recreation Occurs on National Forests



National Forests offer unparalleled opportunities for family recreation.

RECREATION

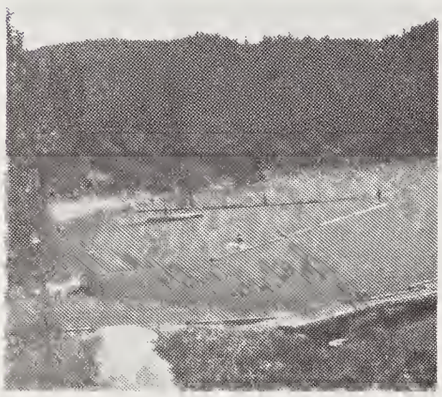
The Forest Service's goal in managing outdoor recreation on NFS lands is to provide for a variety of recreation experiences in a natural setting that offers a contrast to urbanization.

Recreation Use

More outdoor recreation occurs on NFS lands than on any other single landholding. According to the most recent data available, the National Forests and National Grasslands receive 43 percent of the total recreation visitor-days (RVD's) of use that take place on Federal lands.

National Forest recreation includes a wide spectrum of activities ranging from camping at constructed facilities to backpacking in primitive settings (tables 36 and 37).

In 1986, 226.5 million RVD's occurred on NFS lands. The 1986 use was within 1 percent of the RPA projection (table 13).



Since 1982, recreation use on NFS lands has declined 3 percent—2.3 percent at facilities and 3.3 percent in general forest areas. Reasons for the decline are not fully understood. Many managers believe that site deterioration affecting the quality of the outdoor experience and closures reducing recreational opportunities are factors. Refinements in our counting of RVD's may have also adjusted the numbers, reflecting a slight decline.

Use at Forest Service-operated facilities such as campgrounds, picnic areas, and swimming and boating sites was 50.5 million RVD's. This amounted to about one-fifth of total recreation use. Facilities operated by other public agencies or the private sector on NFS lands, such as ski areas, accommodated an additional 14 percent of total visitation.

Recreation use away from facilities in general forest areas accounted for 144.2 million RVD's, or about two-thirds of total use, demonstrating the continued popularity of the less confined and less regulated recreation opportunities. Of the total use, 12.0 million RVD's occurred in wilderness and primitive areas.

To provide better utilization of the many outdoor recreation opportunities available, the Forest Service, in conjunction with the Travel for Tomorrow Council, initiated a new media campaign, "Room to Roam." The focus of this campaign is to get better, more efficient distribution of use by showing potential visitors the many recreational opportunities available, often in the lesser known areas. The campaign also encourages using private-sector facilities for overnight accommodations and services.

Receipts

The Forest Service is continuing to increase fee receipts, as it has throughout the 1980's. In 1986, the median fee for an NFS campsite increased to $4.30, with 2,122 campgrounds on the fee system.

For comparison, in 1981 the median fee was $2.34, and 1,648 campgrounds were on the fee system. All Forest Service facilities that meet the criteria in the Land and Water Conservation Fund Act of 1965 are now on the fee system.

Fees for use of Forest Service facilities generated $10.9 million in 1986, compared to $12.1 million in 1985. This decrease was due to percentage leasing of many Forest Service campgrounds to the private sector. Fees for recreation special uses, derived primarily from ski areas and recreation residences, generated $19.3 million, an increase from $18.7 million in 1985. User fees for recreation residences were again lowered this year, as directed by Congress in the 1986 Appropriations Act.

Total recreation receipts in 1986 were $30.3 million. Expenditures for recreation were $99.0 million. Fees, therefore, recovered 30 percent of total recreation costs.

Interpretive associations are nonprofit, public service organizations established to further the interpretation and understanding of resource management on the National Forests. In 1986, interpretive associations contributed $470,000 to the National Forests from donations and from gross sales of $1,300,000 primarily from books and maps.

Trails

The trail system, used for resource management activities as well as for recreation, provides access to vast areas of NFS lands (table 38). The 1986 RPA recommended level for trail construction and reconstruction was 755 miles--the target actually funded in 1986. Work was accomplished on 912 miles. Most of this work was reconstruction of existing trails, not building new trails. In addition, employees in human resource programs constructed or reconstructed 180 miles; 105 of these miles were done by volunteers. Currently there is a backlog of $100 million in needed trail reconstruction or maintenance. This backlog is a result of increased use, weathering, and postponing of routine maintenance.

Trail miles decreased from a high in the mid 1940's of 150,000 to 95,348 in 1975 and have risen to 99,761 today. Prior to the mid 1940's, trails rather than roads provided most of the access to the National Forests. They were used primarily for administrative activities (fire suppression and supplying lookouts), in contrast to today's recreation use.

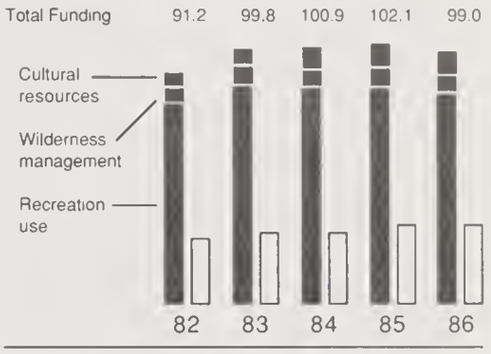
As the Nation and our needs for improved access developed, trails were replaced by roads suitable for vehicular traffic. Today over one-third of recreation use occurs on roads and about 8 percent on trails. Some additional trails have been eliminated from the system because they were not used or their condition did not meet safety or other standards.

During the past decade, trail mileage has increased slightly, reversing the previous trend. The new trails that are being built are designed to serve recreation needs or convert trails originally built for administrative purposes to recreational use. While trail use is less than 10 percent of our total recreation use, it is a cost-efficient recreation capital investment.

Recreation Facility Management

Historically, as National Forests have become more heavily used, recreation facilities have been built to protect the environment as well as to provide for visitors. These facilities include campgrounds, trailheads, boat ramps, picnic areas, and visitor information centers.

Recreation—Funding and Receipts



(Million Dollars)

	82	83	84	85	86
Funding					
Cultural Resources	6.3	6.7	9.4	9.6	9.3
Wilderness	6.1	7.2	6.8	7.8	7.5
Recreation use	78.8	85.9	84.7	84.7	82.2
Receipts	25.4	27.8	27.5	30.8	30.3
Receipts as percent of funding	27.9	27.9	27.3	30.2	30.6

Recreation Facilities—Accumulating Deferred Maintenance

	78	79	80	81	82	83	84	85	86
Million dollars in deferred maintenance	134	176	248	268	283	294	296	297	296

Visitors to the Mount St. Helens National Volcanic Monument take an interpretive tour of the Meta Lake blowdown area.

In FY 1986, the Forest Service operated a facility capacity of 109 million PAOT (people-at-one time) days with human resource programs contributing an additional 17 million for a total of 126 million. This is an estimated 5 percent fewer PAOT days than in FY 1985 and is related in part to deferred facility maintenance. When maintenance is deferred, the service and value of the facility are affected. As a result, facilities may be closed to public use more frequently or for longer than in the past. Such closures are deemed necessary to protect health and safety and to prevent deterioration resulting from public use. To the extent that deterioration related to weather and other factors continues, the life of the facility is shortened and the value of the asset is depreciated.

Deferred maintenance now totals $296 million. It represents a real risk of loss of a major capital investment in recreation facilities.

Recreation Site Construction

In 1986, Congress appropriated $10.9 million for recreation construction. The following projects were included: Mount St. Helens facilities, WA (see Mount St. Helens section); repair of flood-damaged facilities on the Monongahela National Forest, WV; Clear Creek Recreation Area, AL; recreation facilities on the Mt. Hood National Forest, OR; Cradle of Forestry, NC; and the historic Sheep Crossing Bridge, AZ. The balance provided for high-priority needs, primarily rehabilitation and reconstruction of existing facilities.

Cultural Resource Management

The Historic Preservation Act of 1966 directs the Forest Service to identify and protect significant properties during activities that disturb the surface of the land; for example, roadbuilding, campground construction, and timber harvest. Archeological surveys must be done before project proposals can be approved. In 1986, survey sampling was done on 2.4 million acres. These surveys identify properties that have cultural, prehistorical, or historical significance. Of those properties evaluated, 255 are now on the National Register of Historic Places, and an additional 8,500 are deemed eligible for listing.

Mount St. Helens National Volcanic Monument

Visits to the Mount St. Helens National Volcanic Monument increased 12 percent to 558,000 people. In addition, 321,700 people visited the temporary Visitor Center. Winter recreation activities increased considerably, particularly cross-country skiing.

We opened approximately 21 miles of trail. Survey and design work was completed and the contract advertised for reconstruction of road 99, the major public access road in the Monument. Contractors completed the rehabilitation of one campground and the construction of three viewpoint/interpretive sites. Survey and design were begun on several new viewpoints, a parking area for visitors to a lava tube cave, and an information station. The Visitor Center building was substantially completed in time for the formal dedication on December 13, 1986.

WILDERNESS

The goal in managing wilderness is to provide for wilderness use, protect wilderness resources, and reduce conflicts between the uses and the values of wilderness. These values include solitude and naturalness, as well as ecological and geological features of scientific, educational, or historic importance.

The Forest Service completed a collection of water samples from 425 lakes in designated wilderness as part of a project by the Environmental Protection Agency (EPA) to test 888 lakes in 10 Western States to learn more about the effects of acid rain on the environment. Forest Service personnel, traveling by horse or on foot, collected water samples from wilderness lakes. For survey validation, EPA was permitted, in a few limited cases, to use helicopters to determine if the collection results were comparable.

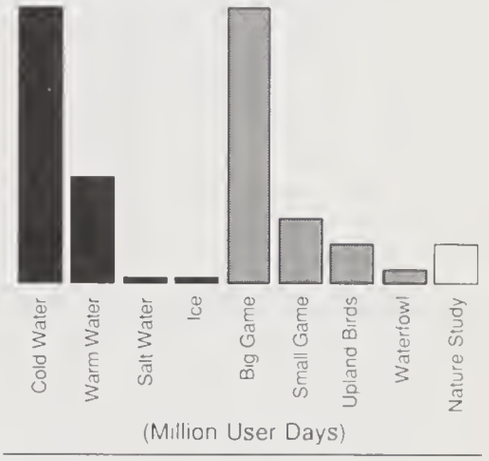
Recreational use of wilderness and primitive areas totaled 12.0 million RVD's, down from 1985, when use was 12.7 million RVD's. The amount of land in the Wilderness System has increased. The 99th Congress added eleven wildernesses to the System, bringing the total to 329. In addition, six existing wildernesses were enlarged. In all, 32.4 million acres, 1 acre in 6 of the National Forests, are wilderness.

WILDLIFE AND FISH

The Forest Service manages wildlife and fish habitat on National Forest System lands; the States manage the animal populations on these lands. Wildlife and fish program plans developed with 43 States under the Sikes Act are part of the Forest planning process. Goals are based on legal mandates to sustain full biological diversity, demand for recreational and commercial uses, habitat management opportunities, costs, and net economic benefits.

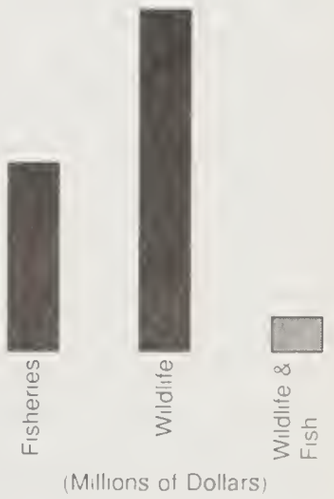
Wildlife and fish resources on National Forest System lands provided nearly 32 million user-days for hunters, fishermen, birdwatchers, and others. (These are included as RVD's in the recreation use figures in tables 36 and 37.) These activities represent about 14 percent of all recreation on National Forests. Using RPA planning information, the value of hunting provided is estimated at $396 million; the value of fishing provided is estimated at $204 million. Congress appropriated $37.1 million in FY 1986 for management to sustain and increase these benefits.

Wildlife and Fish User Days in FY 1986



Fishing	
Cold Water	10.7
Warm Water	4.1
Salt Water	0.2
Ice	0.2
Hunting	
Big Game	10.7
Small Game	2.5
Upland Birds	1.5
Waterfowl	0.5
Nature Study	1.5

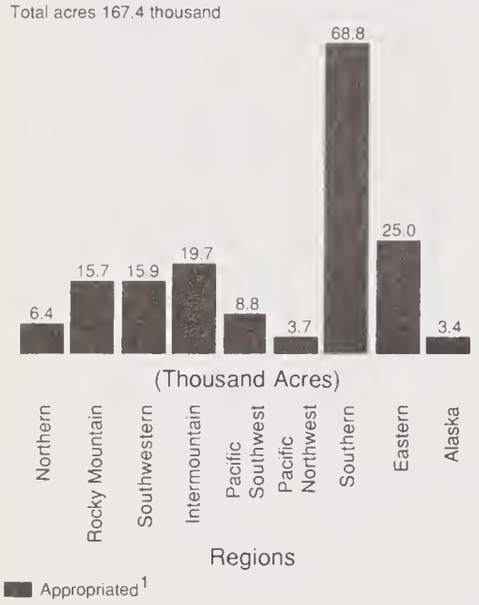
Wildlife and Fisheries Benefits and Costs in FY 1986



Benefits	
Fisheries	204
Wildlife	396
Costs	
Wildlife and Fish	37.1

Sunlight silhouettes the leaves of undergrowth hardwoods against the bole of a conifer in this wilderness shot from the Pacific Northwest.

Habitat Improvement



[1]Includes wildlife, fish, and threatened and endangered species habitat improvement (See table 42).

Wildlife and Fish Habitat Improvement

Habitats were maintained and improved in 1986 to maintain current levels of wildlife and fish production in concert with other resource programs. Many of the completed Forest land management plans call for increases in wildlife and fish habitat capability.

The Forest Service used appropriated funds to improve 155,000 acres of habitat, which was 100 percent of the funded target. Most of this effort was for improvements and offsite mitigation of impacts associated with other resource activities. Prescribed burning, which provides benefits for many species of wildlife, accounted for most of the habitat improved, particularly in the Southern Region.

Knutson-Vandenberg (K-V) funding from timber harvest receipts --a significant component of the wildlife habitat-management program--is used to maintain or improve the quality of wildlife habitat in areas affected by timber harvest. Approximately 200,000 acres of wildlife habitat were treated with funds from timber sale receipts. K-V funding was increased from $5.9 million in 1985 to $6.6 million in 1986. The funding increases resulted from increased timber harvest levels in 1986.

Technical assistance provided to other resource activities, such as timber harvesting, stand management, and rangeland improvement, contributed to the maintenance or enhancement of habitat quality on additional acreage.

Habitat improvements facilitated the maintenance of populations of wildlife and fish species in public demand, such as deer, elk, grouse, wild turkey, waterfowl, trout, and bass. Results include the following:

- Ducks Unlimited, Inc. (DU) continued its waterfowl habitat protection and improvement activities on public lands. In 1986, facilitated by a cooperative agreement, cooperative habitat improvement projects funded by DU were completed in several States. Progress was made with DU to install and test the use of artificial nest structures for increasing production of dusky Canada geese on the Copper River Delta in Alaska.

Challenge Grant Program

Congress authorized $950,000 in FY 1986 to initiate a fish and wildlife Challenge Grant program on National Forest lands. It has been a successful effort in all Regions, involving cost-sharing with more than 100 conservation organizations (such as the National Wild Turkey Federation, the Rocky Mountain Elk Foundation, and Trout Unlimited) and State and Federal agencies. These groups contributed $1.7 million (money, materials, and services) for cooperative habitat improvement projects.

Cooperators were involved in a wide range of projects such as forest wildlife habitat improvement (deer, elk, grouse, turkey, songbirds, etc.), wetlands development, reintroduction of peregrine falcons, nest box construction, road closures (to protect eagle nests and other endangered species), and stream habitat improvements.

Biologists from the State of Georgia, three National Forests in the Southeast, and Trout Unlimited use fish stunners and nets to sample aquatic life from the Chattooga River.

In addition to accomplishing wildlife and fish habitat improvements, the Challenge Grant program is strengthening partnerships with Forest users. These cooperative projects provided unique opportunities to improve habitat, develop better understanding of mutual goals, and reduce user conflicts.

Challenge Grant projects completed in FY 1986 include:

- The Southern Region managed a conservation camp for fish and wildlife volunteers, with funding provided by several conservation and civic organizations. Numerous stream habitat improvements damaged in the 1985 flood were repaired and others constructed. Wild turkey and grouse openings, fish attractors (in lakes and reservoirs), and instream habitat improvements were also developed or installed in cooperation with conservation groups and State fish and wildlife agencies.
- In cooperation with the Foundation for North American Wild Sheep, Martin Marietta Aerospace, Colorado Division of Wildlife, the Wyoming Game and Fish Department, and the Rocky Mountain Bighorn Society, the Rocky Mountain Region improved 4,000 acres of bighorn sheep habitat. In all, through this and other Challenge Grant projects, a $215,000 investment in Forest Service funds was cost shared 50/50 with cooperators in the Region.

Wildlife and Fisheries Habitat Relationships

During FY 1986, significant progress was made in the use of the Wildlife and Fisheries Habitat Relationships (WFHR) system. Through the use of this system, wildlife and fish input to Forest plans, environmental analyses and projects on the ground were improved. A total of 21 habitat capability models for evaluating wildlife and fish habitat were operational in 1986. For example, the Routt and the Pike and San Isabel National Forests used WFHR modeling extensively in analyses related to the Denver Water Department System-wide Environmental Impact Statement.

Other models facilitate monitoring and evaluating resource interactions. The COWFISH model, for example, is being used to assess and adjust grazing practices in our allotment plans to meet fisheries goals.

Cumulative effects models are being used more frequently. Three models were developed in 1986: the Grizzly Bear Cumulative Effects Model for the Yellowstone Ecosystem, the Fish-Sediment Response Model developed for the Idaho Batholith Watershed, and the Spotted Owl Assessment Model used by the National Forests of Oregon and Washington. Region 10 is also developing cumulative effects models and habitat capability models for fish. Region 2 is using habitat capability models to guide and evaluate resource management treatments.

Implementation of Forest plans in all Regions involves increased use of WFHR models and concepts. In addition to cumulative effects analysis and population viability analysis, WFHR models facilitate risk assessment for threatened, endangered, or sensitive species, and evaluation of habitat capability and project economics. The models are also being used by cooperators, such as State fish and wildlife departments, Indian tribes, and others, in developing comprehensive wildlife management plans.

The WFHR system has improved our ability to quantify wildlife and fisheries resources and provided better methods for addressing diversity, viable populations, and featured species production.

Resource Coordination

Wildlife and fish habitat needs are considered in planning for resources development programs such as timber and minerals management. Timber management programs are important to help meet habitat improvement objectives for species such as deer, elk, and turkey. For example, some timber sales were planned to improve elk habitat by harvesting in locations that will provide forage close to areas of cover. Funding of resource coordination was maintained in FY 1986 at about the same level ($12.6 million) as in FY 1985.

Threatened, Endangered, and Sensitive Species Management

Our National Forests and National Grasslands are home to 141 plant and animal species listed or proposed as threatened or endangered. An additional 670 species (126 animals, 28 insects, and 516 plants) are being considered for listing. Recovery plans have been written for 80 species. Two species are being considered for downlisting from endangered to threatened (Gila topminnow and Gila trout).

National interest and emphasis are being given to the bald eagle and peregrine falcon. Regional emphasis continues on the grizzly bear, spotted owl, Puerto Rican parrot, and red-cockaded woodpecker. Other species receiving emphasis are the mountain caribou, California condor, Kirtland's warbler, Lahontan cutthroat trout, Oregon silverspot butterfly, and several plant species.

The draft "Interagency Guidelines for Grizzly Bear Management" was published in the Federal Register. The final guidelines will be published in early 1987. A long-range management program "Charting the Course—The Forest Service Grizzly Bear Conservation Program" has been initiated by the four Regions involved.

Region 6 released the Draft Supplement to the Environmental Impact Statement (DEIS) for the Regional Guidelines for land management planning concerning the spotted owl. Management alternatives and public comments on the DEIS will be evaluated during FY 1987. This DEIS presented 12 alternatives for management of the spotted owl. Over 40,000 responses were received from the public. A risk assessment approach to viability analysis for the spotted owl was used, and draft standards and guidelines for adaptive habitat management were prepared and presented in the guidelines.

Habitat improvement funding for threatened and endangered species was maintained at the same level ($2.5 million) as in FY 1985.

RANGE

The Range program's focus is management of range vegetation to maintain or improve its productivity and condition for many resource values, including grazing. How range vegetation is managed affects water quantity and quality, soil productivity and stability, wildlife habitat, and esthetics, as well as the forage available for domestic livestock and wild, free-roaming horses and burros.

As land management plan (LMP) decisions are made, they become the basis for designing and carrying out range activities. Range management activities are based on an integrated approach considering all resources that are interrelated with the range vegetation.

One of the first steps in implementation of each Forest's plan is reviewing and updating allotment management plans to ensure their conformance with the LMP standards and guidelines for range management. About 102 million acres (53 percent of all NFS lands) in 36 States are included in 10,387 range allotments.

The range program was funded at $30.5 million in 1986 and returned $8.6 million from grazing fees. Grazing fees were set at $1.35 per animal month for the National Forests in the 16 Western States in 1986 by Presidential executive order. Fifteen percent of the receipts are from grazing on National Grasslands and Land Utilization Projects in the Plains States as well as on eastern NFS range. Fees for the latter areas ranged from $0.50 to $2.98 per animal month.

The Forest Service administered 13,805 permits in 1986 for 10.1 million animal unit months (AUM's) of grazing by cattle, horses, sheep, and goats. (An animal unit month is the amount of forage needed to support a 1,000 pound animal for 1 month.) This amount is slightly more than the funded target and RPA recommended level of 9.8 million AUM's. Actual use for the year amounted to 8.6 million AUM's, based on permittee requests not to use all of the permitted AUM's. The difference primarily reflects current economic conditions affecting the livestock industry.

Through its ecology program the Agency is classifying forest and rangeland vegetation to facilitate inventory and management activities. These classifications will help managers predict the response to various vegetation management strategies, including grazing systems, thus increasing the efficiency of the range management program.

In consultation with range users and other resource interest groups, the Forest Service develops cost-effective range resource improvements. This approach significantly improves cooperation among the varied interests, which expedites actions that can lead to improved range vegetation or better management of the domestic livestock. Improvements are also designed to benefit wildlife, improve soil and water quality, and protect watersheds while providing for sustained use by livestock.

Just over half of the acreage in the Forest Service's care is rangeland, and it must be managed for a variety of uses, including grazing by sheep.

Range Funding and Receipts

	82	83	84	85	86
Total Range Funding	33 9	32 4	31 3	32 2	30 5
(Million Dollars)					
Range Management Funding	27.3	27.0	27.3	28 2	26 9
Range Betterment Funding	6.6	5 4	4 0	4 0	3 6
Grazing Receipts	12.4	10.2	9 6	9 0	8 6
Receipts as percent of funding	36 6	31 5	30 7	28 0	28 2

More than 2,260 structural improvements, such as fences, water developments, and pipelines, were constructed with appropriated funds, exceeding the funded target by 27 percent. An additional 1,600 structural improvements were completed with contributed funds, labor, and materials. Range forage improvement work, such as seeding, burning and mechanical treatment of vegetation, was completed on 83,300 acres, exceeding the funded target by 16 percent. Contributed funds, labor, and materials allowed forage improvements on an additional 15,500 acres.

The Forest Service captured 147 excess wild, free-roaming horses and burros, to maintain the populations at appropriate management levels (1,225 horses and 350 burros).

Noxious weeds of various species occur on 1.6 million acres of NFS lands in the Western States, according to 1983 estimates. They are spreading at an apparent rate of 7 percent annually. Weeds create a management problem that affects not only livestock forage but also other resources, including wilderness, wildlife, soil, esthetics, and the land value itself. In cooperation with local weed control districts, the Agency treated 23,307 acres of NFS lands, 13 percent more than were treated in 1985. A viable program for controlling noxious weeds depends on a coordinated effort by all landowners.

SOIL, WATER, AND AIR

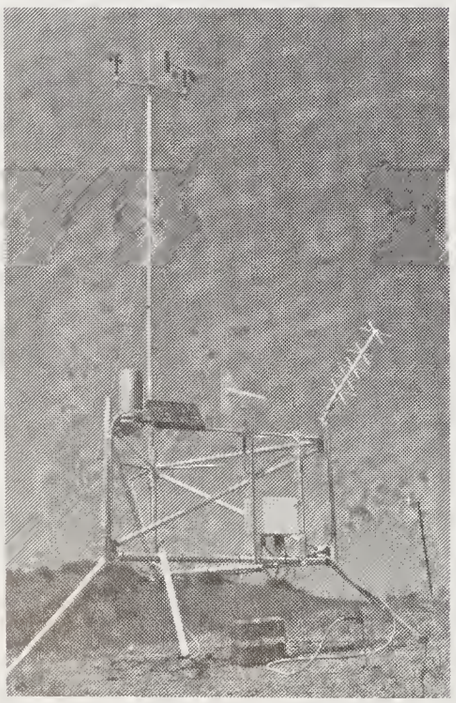
The objectives of the soil, water, and air program are to (1) provide an adequate supply of high-quality water to meet public needs, (2) protect and improve soil productivity, and (3) maintain or enhance air quality.

Resource Coordination

Many soil, water, and air objectives are accomplished jointly with the implementation of other management programs. This is done by designing conservation practices that avoid resource damage, control nonpoint sources of pollution, and maintain riparian values and air quality. Approximately 40 percent of the appropriated funds were spent on such resource coordination.

Air and Weather Program

The Agency reviewed 38 industrial preconstruction permit applications during 1986. The reviews focused on pollution emissions that may impact air-quality-related values in designated class I areas. The applications included major petrochemicals, gas, and minerals developments. Air-quality-related values, such as visibility and lake chemistry, are being monitored at 32 sites to evaluate resource effects and needs for protection.



This automated weather station is located at a remote site in the Western United States.

The weather program has been established to incorporate meteorological expertise and data into overall Forest Service management. Efforts are underway to improve maintenance, quality assurance, and siting of the remote automated weather stations. The program expertise will be used to improve the current fire danger rating systems and to develop an efficient weather data system to meet Forest Service and cooperators' needs.

Monitoring

Monitoring of soil, water, and air resources determines if resource prescriptions are properly designed and implemented, and if they are effective in meeting management objectives. Examples of 1986 accomplishments follow.

- Monitoring of timber sale activities on the Goat Creek drainage, Gifford Pinchot NF, confirmed that Best Management Practices were correctly designed and implemented. Management practices, including full suspension logging over stream channels, leaving all embedded logs in channels, and removal of floatable material from channels, were determined to be effective in preventing unacceptable increases in turbidity.

- The Coconino NF reforestation/soil moisture monitoring program documents soil moisture withdrawal and recharge patterns. Through this effort, the availability of soil moisture and its effect on ponderosa pine seedling mortality will be estimated.

- Soil compaction by offroad vehicles is a common soil management problem. Monitoring results indicated soil ripping, followed by seeding Blando bromegrass, was effective in restoring soils on the Los Padres NF. Other successful practices included fencing, check dams, water bars, and mulching.

Emergency Rehabilitation

Emergency rehabilitation plans were made for 6,596 acres of flood-damaged lands under the Agriculture Credit Act of 1978. Burned-area rehabilitation plans were made for grass seeding and other erosion control measures on 164,401 acres. The majority of the acreage was in California and Oregon.

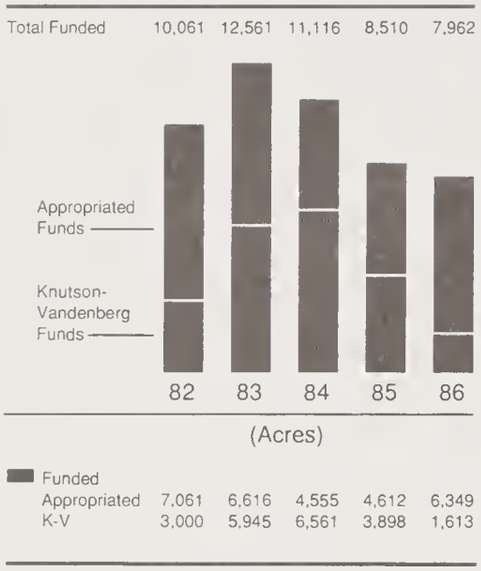
Inventories

In 1986, the Forest Service completed soil inventories on 5.6 million acres as compared to 6.6 million acres in 1985. This decrease in total acres reflects a shift to more detailed surveys, a need identified through Forest plan implementation. These inventories provide information about soil suitability and productivity, erosion, and stability problems. Most Forest Service soil inventories are conducted as part of the National Cooperative Soil Survey.

Inventories were also completed on an additional 3.1 million acres for water resource data. They provided information needed to improve water yields, quantify water rights, and determine conditions in riparian areas.

After a severe fire on the Wallowa-Whitman National Forest, our emergency watershed rehabilitation effort utilized helicopters to quickly and efficiently reseed high-risk areas.

Soil and Water Resource Improvement



Soil and Water Resource Improvement

Soil and water improvement from all funding sources totaled 12,698 acres. Total improvement surpassed targets due to additional acreage completed by Human Resource Programs and increased use of specially designed equipment. Appropriated funds were used to improve watershed condition on 8,080 acres, including 126 acres in the Lake Tahoe Basin.

Knutson-Vandenberg (K-V) Act funding from timber harvest receipts is an important component of improving soil and water productivity. Many cost-effective improvements such as restoring the productivity of abandoned roads or gravel pits can be done on sale areas. K-V funded improvements on 3,562 acres in 1986.

Approximately 87 acres of abandoned mined lands were treated with funds from the Surface Mining Control and Reclamation Act and other State sources. Human resource programs and volunteers improved watershed condition on another 344 acres.

FACILITIES

Due to the decentralized organization and wide geographic distribution of lands and land-management units, many offices, buildings and related facilities are needed to support the Forest Service mission. More than 21 million square feet of owned and leased facilities support the various programs of the National Forest System, Research, and State and Private Forestry branches.

Most of these facilities (78 percent) are owned rather than leased. Owned facilities include employee, family, and crew quarters, equipment and vehicle storage areas, shops, nurseries, laboratories, firefighting support, and administrative offices.

Most Forest Service facilities were constructed with a life expectancy of 30 to 35 years, and today more than half are structurally and/or functionally obsolete. Approximately 46 percent of the owned facilities were constructed prior to 1940. Program support facility needs continue to change, and older buildings require major maintenance and renovation. Historically, annual funding for facility maintenance has been less than 1 percent of the replacement value, estimated at $1.7 billion. This has resulted in a rising backlog of postponed maintenance.

New facilities are needed to respond to organizational changes and to replace old buildings where maintenance costs are high. Efficiencies are gained through colocation, moving out of high-cost leases, and replacing old buildings where it is less expensive to replace the facility than to maintain it. The estimated backlog of replacement construction exceeds $500 million.

The Forest Service is implementing two facilities management initiatives that will reduce costs and improve the effectiveness of these support facilities. One is a major effort in facilities master planning to ensure identification of needed facilities. The facilities master plans will provide long-term strategies toward our goal of cost-effective replacement, operation, maintenance, and management of Forest Service-occupied buildings. While appropriated funds will be required for most facilities construction, some obsolete sites and facilities may be exchanged for new facilities. Such exchanges will help to reduce maintenance and construction costs.

The second initiative involves improved maintenance management designed to stretch our facilities maintenance funding. Through this effort, maintenance tasks and projects will be more carefully evaluated and implemented. Conservative estimates indicate the initiative will lead to a 10- to 15-percent increase in the productivity of maintenance expenditures. The effectiveness of this initiative will be reviewed and evaluated by the end of FY 1988.

ROADS

The Forest Development Road System provides the principal access to National Forest lands in accordance with decisions reached in the land management planning process. The system serves all resource management programs, including fire suppression; removal of energy resources, such as oil, gas, coal, geothermal steam, uranium, and firewood; harvesting of timber; reforestation and timber-stand management; recreation activities, including camping, hunting, fishing, and pleasure drives; and livestock grazing.

Each road in the transportation system is classified according to function as arterial, collector, or local. Arterial roads have relatively high-volume traffic and provide the main access through the Forest. They are generally double-lane paved roads. Collectors are normally single-lane gravel-surfaced roads that provide all-weather access to major land areas within the Forest, and link the local roads to the arterial. Locals provide access from the collector roads to specific sites and are normally single-lane (12 to 14 feet wide) dirt- or gravel-surface roads designed for slow traffic. Local roads are often constructed to provide limited vehicle access. They may provide access only during fair weather, or they may be maintained and open for normal vehicles only during specific time periods (intermittent use).

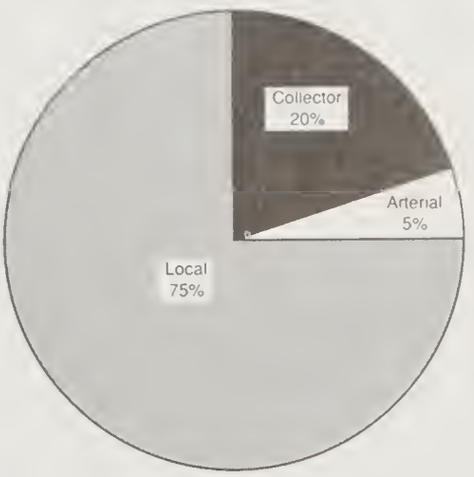
In 1986, the Forest Service acquired 779 rights-of-way for roads. These included 126 miles of rights-of-way for new road construction and the purchase of 528 miles of existing roads needed to provide multiple-use access to National Forest lands. All of these rights-of-way were acquired without the use of condemnation.

Forest Service roads are classified according to access function. This is an arterial road, the type that provides access to large land areas (those greater than 20,000 acres).

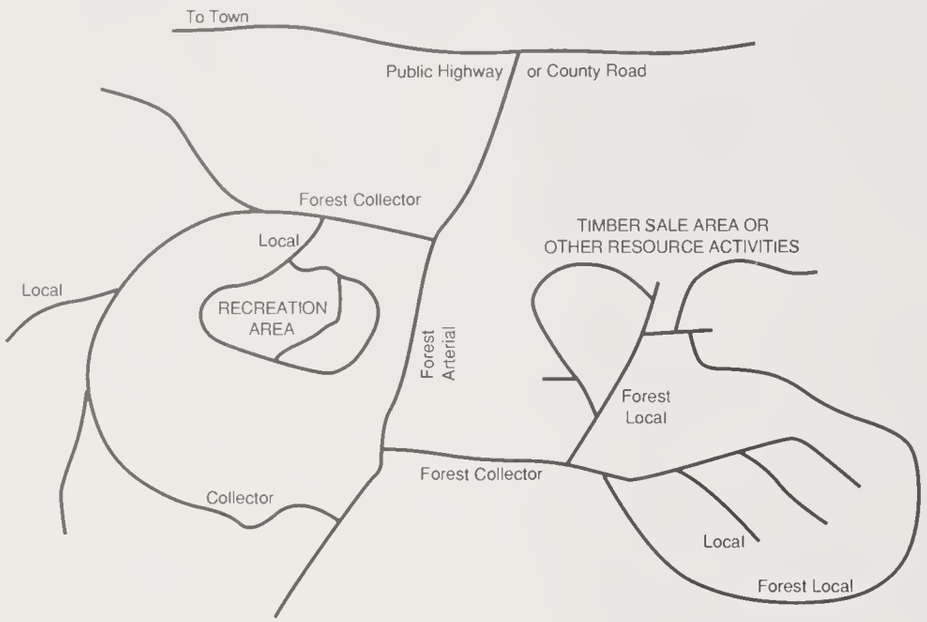
Collector roads like this one provide access to parcels of 5,000 to 20,000 acres and link local and arterial roads.

Local roads access parcels smaller than 5,000 acres but make up 75 percent of all the roads we build.

Type of Road— Distribution by Mileage



National Forest Road Classification



Construction and Reconstruction

The typical Forest road project in 1986 was the construction or reconstruction of a relatively low-standard (single-lane, 12 to 14 feet wide, dirt- or gravel-surface) local road to provide access to the timber resource. These roads will be used in the future management and enjoyment of other resources. Most higher standard arterial roads, which provide major access routes, are in place and require only limited investments for restoration or betterment. The same is generally true for collector roads, except in the few Forests with large unroaded areas, where some new construction is required for initial timber-management access.

Forest road funding comes from three sources: (1) the Purchaser Credit Program (PCP), which provides for building roads in exchange for timber; (2) the Purchaser Election Program (PEP), which allows small purchasers to elect to have the Forest Service build roads funded from timber payments; and (3) the Forest Road Program (FRP), which provides for building roads with appropriated funds.

A total of 6,417 miles of road and 74 bridges were constructed or reconstructed through PCP, PEP, and FRP at a total cost of $277.2 million, including engineering and program support costs. This compares to the RPA projection for FY 1986 of 7,662 miles constructed or reconstructed for all roads. Through the PCP/PEP, 2,033 miles were constructed and 3,132 miles were reconstructed. The FRP provided for construction of 452 miles and reconstruction of 800 miles.

Approximately 47 percent of the roads constructed in 1985 were planned for intermittent use and will be open to normal vehicles only when needed to support specific resource-management activities. These roads usually remain open for foot travel. This same intermittent-use situation is anticipated for roads constructed in 1986. A breakdown of miles, unit costs and miles by Region is provided in the table, page 36. The "target values" are the congressionally directed 5-percent reduction from programmed 1985 unit costs. All Regions except Region 2 met the cost-reduction targets, and total miles constructed were below the congressional cap of 7,682 miles. Region 2 unit costs exceeded the target value because a significant number of timber sales with relatively low-cost miles were turned back to the Forest Service for construction late in the fiscal year. These miles will be accounted for in FY 1987.

The cost reductions indicated in the table (p. 36) are the result of direct management attention to the issue of road costs. Through various management initiatives, particular attention has been paid to the major costs in the road program. Intensive land-use planning revealed that perennial use of many new roads is unnecessary. Thus, the percentage of intermittent-use roads is increasing. Intermittent-use roads are generally designed to lower standards than roads to be open for continuous use and thus are less expensive to construct. During periods of nonuse by normal vehicles, these roads are generally available for other uses including snowmobiling, recreation, offroad vehicles, horseback riding, and hiking. In some Regions, the roads are seeded to grasses or native vegetation to serve as linear wildlife openings. Improvements in other costs, such as construction and engineering services also contributed to the cost savings.

In some cases, actions taken to manage costs have resulted in cost deferral and cost transfer. Examples of these are (1) cost deferral by requiring less surfacing materials now and more frequent reconstruction later, and (2) cost transfer by constructing lower standard roads (particularly with steeper grades, rough running surfaces, etc.) that raise the road-users' costs. Roads are designed to serve the projected traffic requirements at the lowest cost for transportation, which includes construction, maintenance and user costs, consistent with environmental protection and safety considerations. A comparison of mileage and unit costs for the period 1984-86 is included.

New roads are often designed for intermittent use. In 1980 this road was closed after a timber harvest.

The same road in 1986, after 6 years of nonuse.

As part of our land management planning and transportation analysis, we are identifying roads that will be obliterated because they are no longer needed for resource management activities. Thus, the growth of the Forest transportation system will be less than the new construction shown below. Exact mileage on road obliteration is not yet available.

Summary of Road Construction/Reconstruction

Regions	FY 1986 "Target" for Unit Cost	Actual Unit Costs FY 1986	Miles
	(Thousand dollars per mile)		
1	52.55	37.86	1,119
2	37.76	44.02	312
3	37.21	26.33	553
4	42.68	18.66	413
5	60.40	50.76	769
6	57.73	48.35	1,789
8	41.27	36.01	923
9	44.18	41.56	460
10	1,594.5 *	83.26	79
National	55.24	42.31	6,417

* Base figures for FY 1985 contained a large number of bridges.

Road Construction/Reconstruction
Average Unit Costs 1/

(Actual dollars in thousands)

FY 1984

Program	Cost	Miles	Cost/Mile
Forest Road	62,760	1,567	40.1
Purchaser Credit	111,057	5,507	20.2
Purchaser Election	10,673	475	22.5

FY 1985

	Cost	Miles	Cost/Mile
Forest Road	67,057	1,858	36.1
Purchaser Credit	107,887	5,712	18.9
Purchaser Election	9,103	472	19.3

FY 1986

	Cost	Miles	Cost/Mile
Forest Road	38,327	1,252	30.6
Purchaser Credit	91,474	4,908	18.6
Purchaser Election	6,218	257	24.2

1/ Excluding engineering and program support services.

Maintenance

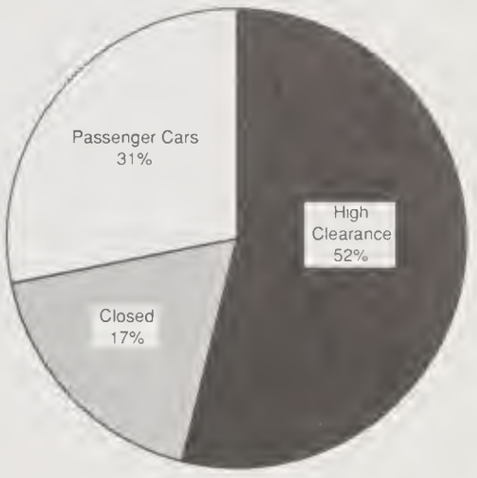
Federal appropriations in the amount of $64,647,000 were used in FY 1986 to perform maintenance work on roads. The maintenance expenditures were equivalent to approximately 0.4 percent of the asset value of the roads, estimated to exceed $18 billion. Commercial forest users, timber purchasers, miners, private timber companies, and others performed road maintenance related to commercial activities. An estimate of overall program distribution is:

- Road maintenance with appropriated funds - 48 percent
- Requirements on Federal timber purchasers - 48 percent
- Requirements on other commercial users - 4 percent

Transportation system maintenance and management activities accomplished during FY 1986 include:

- Inspecting roads and bridges to determine maintenance needs, developing a plan to finance and accomplish work, and coordinating maintenance activities of purchasers and cooperators.
- Performing on-the-ground work, such as roadside brushing, surface grading, culvert cleaning, replacing wornout surfacing, repairing bridges and other structures, and replacing damaged signs needed to maintain safe traffic flow.
- Collecting and analyzing data on the use and physical characteristics of the road system.
- Determining and resolving road jurisdiction and maintenance responsibility with States, counties, other Federal agencies, and private landowners.
- Managing rights-of-way and administering construction and use agreements where it is mutually beneficial for private landowners and the Forest Service to jointly develop and maintain a common road system.
- Determining the need for, developing, and implementing traffic control (vehicle size, type of use, road closures, and use permits) to prevent damage to the road or resources; maintain use within capacity limits; and ensure appropriate maintenance by commercial users.

Road Management—Distribution by Mileage



Our roads are managed for different uses. This one is open for passenger cars.

Brush around this one-lane forest road has been cleared to admit high-clearance vehicles such as logging trucks.

This road has been closed to four-wheel vehicles between resource management activities that require motorized access.

- Cooperating with local authorities such as States and counties in the maintenance and management of roads serving local as well as National Forest needs.

The type and frequency of maintenance needed on individual roads is determined on a case-by-case basis. The maintenance of the 340,000-mile road system is estimated and categorized as follows:

- About 17 percent of the road system was maintained in a closed condition.

- About 52 percent was maintained for use by high-clearance vehicles (pickup trucks, four-wheel drive vehicles, logging equipment, etc.).

- About 31 percent was maintained for use by modern low-clearance passenger cars.

Some roads are closed or restricted to vehicular traffic to achieve specific resource management objectives, prevent resource damage, reduce construction and maintenance expenditures, and prevent unnecessary road damage. Specifically, closures and restrictions may be implemented to (1) protect wildlife during migration, mating, or rearing periods; (2) prevent fires and provide for public safety during periods of high fire danger; (3) protect road investments during inclement weather and unstable ground conditions; and (4) provide for public safety during periods of heavy commercial use.

PROPOSED FOREST SERVICE/BUREAU OF LAND MANAGEMENT INTERCHANGE

The interchange is a legislative proposal by the Forest Service and the Bureau of Land Management (BLM) that would transfer responsibility for land and minerals management between the two Agencies for the purpose of improving public service, increasing management efficiency, and reducing costs.

On several occasions, the BLM and the Forest Service have worked out arrangements, through memoranda of understanding, for managing interspersed parcels of Federal land under each other's jurisdiction. Also, Congress has enacted legislation that modified National Forest boundaries and consolidated management in several locations. The interchange, therefore, is not a new idea but a much larger scale effort to streamline the management of lands administered by the two Agencies.

In January, 1985, the Forest Service and BLM announced a proposal to interchange land management responsiblity on approximately 35 million acres and transfer minerals management responsibility from BLM to the Forest Service on 200 million acres. During early 1985, several hundred meetings were held, and contacts were made with conservation, industrial, environmental and other interest groups. After a proposal was released to the public, the two Agencies conducted 30 formal public hearings throughout the Nation. The public comment period ended on July 8, 1985. The Agencies found good support for the objectives of the proposal but opposition to some of the specifics. Both Agencies have worked to further modify the proposal to respond to public concerns. The modified proposal reduces the affected lands from 35 million acres to approximately 25 million acres. Also, the Forest Service and BLM consulted with key members of Congress and Governors from States where the proposal will have an impact.

The interchange proposal with a Legislative Environmental Impact Statement was submitted to Congress as an Administration proposal in February, 1986. Legislation was introduced by Congressman Udall in March and Senator McClure in April. The legislation was not acted upon by the committees to which it was assigned before the end of the 99th Congress. The Forest Service and BLM will submit the proposal again in the 100th Congress.

State and Private Forestry

State and Private Forestry

INTRODUCTION

State and Private Forestry provides technical and financial assistance to States to help increase the productivity of nonindustrial private forest lands to meet projected resource demands. The Cooperative Forestry Assistance Act of 1978 authorizes assistance to the States in forest management and utilization, fire prevention and control, and prevention and control of forest insects and diseases. The Forest Service assists States with those activities that provide national benefits.

State and Private Forestry provides fire protection on National Forest System lands as well as protection assistance on State and private lands. It also provides protection from insects and diseases on all Federal and non-Federal forest lands.

The State and Private Forestry cooperative programs are presented in four categories:

- Land and Resource Protection
- Forest Management and Utilization
- Special Projects
- Other Programs

Congress appropriates funds to the Forest Service for programs in the first three categories. Funds for the "other programs" are transferred to the Forest Service by the Soil Conservation Service and other Federal agencies. Targets, listed in tables 52 and 53, are accomplished with a combination of State and Federal funds.

LAND AND RESOURCE PROTECTION

Fire and Aviation Management

In August, the Cooperative Fire Protection staff and the Aviation and Fire Management staff officially combined into a single unit, Fire and Aviation Management. Overlapping responsibilities and declining budgets provided the impetus to create a leaner, more efficient organization for the fire-protection program. The key objectives were to:

- Reduce number of personnel needed and associated costs,
- Provide better, integrated service to State and Federal organizations, and
- Provide increased coordination of protection activities.

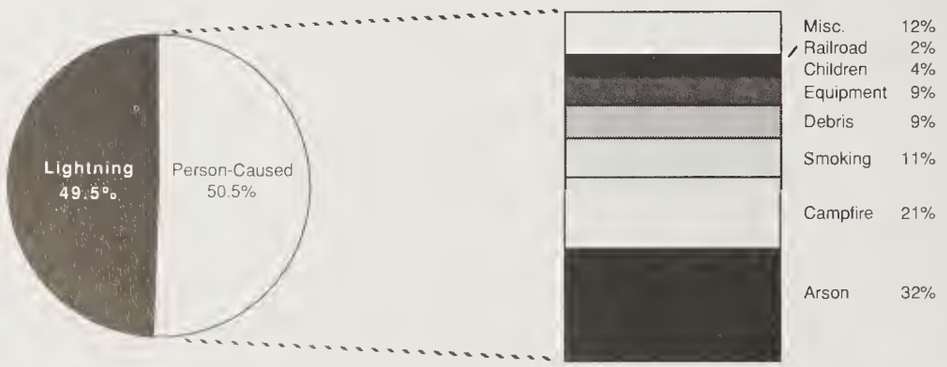
Minimal one-time costs and minimal personnel impacts contributed to the successful merger without any loss of program accomplishment or service.

1986 Fire Season

The 1986 fire season required record-setting mobilization of personnel and equipment. Fire activity began early in January in the Southeastern States, where high person-caused fire starts were aggravated by continued drought conditions. The result was 59,134 wildfires burning 955,463 acres of forested lands, Federal and non-Federal combined.

The peak fire activity for the 1986 season occurred in August. During the first 2 weeks of the month, intense dry lightning storms moved across Oregon and western Idaho, starting multiple fires. The Malheur, Umatilla, and Wallowa-Whitman National Forests in northeastern Oregon had over 800 fires, of which 40 became major fires above 1,000 acres. The Boise and Payette National Forests in eastern Idaho had 157 fires, 9 of which became major. A state of emergency was declared in both Oregon and Idaho due to the critical fire situation. Although the total number of resources

Percentage of Total Fires by Cause Class National Forest System Lands— 5-Year Average (1981-85)



Percent of Total Fires

Percent of Total Person-Caused Fires by Statistical Cause

mobilized was less than in 1985, a record number of resources was mobilized in a shorter period of time. During the month, 659 crews, 396 smokejumpers, and 1,205 support personnel were mobilized and dispatched to fire locations.

Fuels Management

The purpose of fuels management is to reduce the hazards of forest fuels, both natural hazards and those created by our activities. Fuels management objectives are developed on a site-by-site basis considering three essential factors:

- Effective fire protection
- Cost efficiency
- Land management objectives

Consideration of these factors resulted in efficient and environmentally sound treatment of 320,985 acres. Activities supporting the program include field inventories, treatment analyses, prescriptions, project treatments and administration, project maintenance, and monitoring of results.

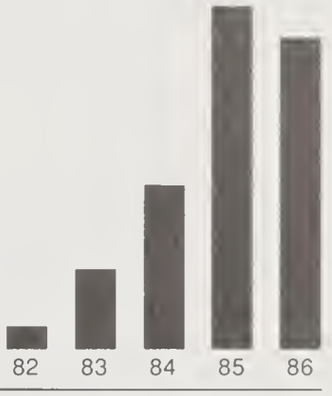
Fire Prevention

"Smokey and the Pros"

In 1984 five major league baseball organizations and one team of the United States Football League volunteered their names, players, and support for a "Smokey and the Pros" fire-prevention campaign in California. Initial efforts were so successful in creating interest and awareness for the fire-prevention program that National Major League Baseball gave the go-ahead for a National Smokey Bear Day in 1987. Planning for these special events is underway.

With brush fires in the Angeles National Forest a constant threat to nearby Los Angeles, it's no wonder that this Dodger supports the "Smokey and the Pros" fire-prevention campaign.

National Interagency Fire Coordination Center (NIFCC)



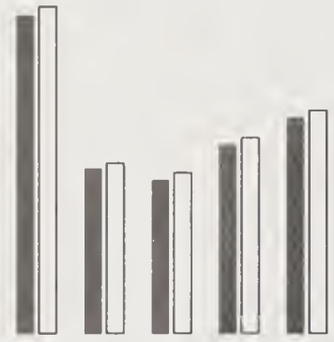
	82	83	84	85	86
Number of crew dispatches through NIFCC to all agencies	48	168	345	724	659

One important use of prescribed burning is to remove residues left after timber sales before such debris can become a fire hazard. Here, a buncher is piling up leftover slash pine branches prior to burning.

Forest Service Protection
National Forest System Lands Only

Fiscal year	Lightning-caused (Number of wildfires)	Person-caused (Number of wildfires)	Total fires (Number of wildfires)	Acres burned
1985	5,399	4,804	10,203	566,952
1986	5,619	4,902	10,521	346,385
1982-86 average	4,739	4,587	9,326	235,594

Number of Wildfires on State and Private Protected Lands — Nationwide



(Thousand Fires)

	81	82	83	84	85
Person-caused	169	88	81	101	115
Total Wildfires	174	91	85	105	119

This beautiful but highly combustible frame home is sited at the edge of a National Forest tract at what we call the urban/wildland interface.

National Wildland/Urban Fire Protection Initiative

In 1986 the Forest Service, National Fire Protection Association, and Fire Administration initiated a nationwide program to address the growing problem of effective fire protection in "interface areas."

Interface areas, places where wildlands intermingle with residential development, have long been recognized by firefighting organizations as potentially volatile fire situations. In 1985 this hazard was dramatically realized when wildfires damaged or destroyed 1,400 structures, burned over 3 million acres, and cost taxpayers over $600 million in losses and firefighting expenses. This expanding threat to life and property prompted the initiation of this program in 1986.

Seminars, brochures, videos, and training sessions comprise our initial efforts to provide information and guidance on the wildland/urban protection issue. The initiative will focus on local communities solving community problems to reduce the hazards and losses due to wildfire. A research program is being developed to support this initiative.

Rural Fire Prevention and Control Program

The Rural Fire Prevention and Control (RFPC) program provides technical and financial assistance to States in support of national interests for protecting non-Federal wildlands from fire. This effort has led to increased national capability and mobility of State suppression forces during a period of decreasing State budgets.

Several States are conducting and refining joint analyses to better coordinate fire protection between States as well as to provide a larger overall fire-protection organization, mutually shared by the participants.

Financial assistance provides the States with funds for maintaining and reporting fire statistics, which are published in "Wildfire Statistics" and made available to the public as well as to members of the fire profession. Funds are also used to provide training of crews shared by Federal agencies during periods of high fire activity, ensuring the skill and performance levels needed to safely and effectively fight fire.

Federal Excess Personal Property

The Forest Service is authorized to loan excess Federal personal property to States for rural and wildland fire protection. This year marked the 30th anniversary of this program, which has focused on improving the management and use of Federal Property on loan. Property originally costing the government over $25 million was loaned this past year.

Excess property is directed to areas with the largest potential efficiency gain based on an analysis of fire protection needs. Funding is not required to purchase property through this program. Using excess Federal property saves local and State governments millions of dollars that would be needed to provide essential fire protection. It also provides increased utility and return on Federal property which would otherwise go unused.

The current fleet on loan to the 50 States and Territories includes 11,000 trucks, 231 passenger-carrying vehicles, 106 single-engine aircraft, 51 twin-engine aircraft, and 37 helicopters.

National Interagency Incident Management System

The National Interagency Incident Management System (NIIMS) coordinates predisaster planning by setting up a uniform fire-suppression organization, establishing common terminology, and improving communication networks among Federal, State, and local agencies, thereby providing improved firefighting capability.

The last 2 years have provided an excellent test and affirmed the effectiveness of NIIMS. This year 700 crews were mobilized for over 10,000 fires throughout the United States. In addition, logistical support was provided to African countries to help combat devastating grasshopper and locust infestations.

National Advanced Resource Technology Center

The Forest Service National Advanced Resource Technology Center (NARTC) located in Marana, AZ, is a national training facility primarily funded by the Forest Service with supporting funds provided by U.S. Department of Interior agencies and States. The facility's staff develops, supports, and conducts national technology transfer courses in the field of fire and aviation management. They also present other training programs for minerals, lands, air quality, and pesticide management.

In 1986, the center conducted 11 national interagency courses and 1 international Spanish firefighting course sponsored by the Forest Service and the Agency for International Development. In all, 725 students received certificates of completion. Students represented the Forest Service, Bureau of Land Management, National Park Service, Bureau of Indian Affairs, Fish and Wildlife Service, State forestry agencies, university faculties, private industry, and several foreign countries.

Forest Pest Management

The Forest Pest Management (FPM) program assists forest managers in protecting forest resources from insects and diseases on all lands. FPM specialists work directly with National Forest managers and forest managers in other Federal agencies, such as the U.S. Department of the Interior and Department of Defense, to provide a coordinated forest pest management program on all Federal lands. The program also provides for technical and financial cooperation with State and private forest managers to see that effective pest management is practiced on these lands. The program was funded at $28.2 million in 1986; non-Federal sources contributed an additional $11.9 million.

This truck, declared excess Federal personal property by the Forest Service, took on a new life with the Michigan Department of Natural Resources.

The tree on the left has already been damaged by western spruce budworm, but the spruce on the right can be protected against this important defoliator with systemic insecticide implanted in the trunk.

Surveys and Technical Assistance

Detecting and evaluating pest problems in their early stages provides information that is used to keep the loss of trees and tree growth at a minimum. Suppression of insects and diseases is conducted only on the highest priority areas.

Detection and evaluation surveys were made on 130 million acres of Federal lands and 464 million acres of State and private lands. The RPA and funded targets were 144 million acres and 411 million acres, respectively. Suppression treatments were applied on 800,000 acres.

Surveys were conducted in response to the gypsy moth outbreak and spruce decline in the East, southern pine beetle in the South, and western spruce budworm and mountain pine beetle outbreaks in the West.

Prevention and Suppression

State and Private Forestry encourages forest managers and private landowners to practice integrated pest management (IPM) so that timber, watersheds, recreation, wildlife, and visual resources are protected. IPM is a decisionmaking and action process incorporating biological, economic, and environmental evaluation of pest-host systems to manage pest populations. Successful IPM requires extensive evaluation and uses a combination of pest prevention and suppression tactics, including silvicultural, biological, chemical, mechanical, and manual means. IPM prevention tactics are long term in scope, and their full effect may not be evident until several years after implementation.

Forest Pest Management was either fully funded or cost-shared for insect and disease protection on about 795,000 acres of forested lands in all ownerships in 1986; 12 percent of this amount was on Federal lands.. Approximately 617,400 acres, or 78 percent, were treated with insecticides. Of these acres, 28 percent were treated with Bacillus thuringiensis (B.t.), a bacterial insecticide; 59 percent with dimilin, an insect growth regulator; and 13 percent with conventional insecticides.

Major pest prevention and suppression projects were conducted against gypsy moth, southern pine beetle, dwarf mistletoe, and mountain pine beetle. All suppression projects protected an estimated 826 million cubic feet of merchantable timber and salvaged an estimated 139 million cubic feet of infested merchantable timber, resulting in approximately $101 million in direct benefits. Recreation, wildlife habitat, watershed, and visual resources were also protected.

Gypsy moths defoliate and kill trees, reducing timber, recreation, esthetic, and property values. Suppression projects in 1986 on 560,000 acres were directed at selected parts of the outbreak area to protect high-value timber stands, recreation areas, and forested communities. Approximately 473 million cubic feet of merchantable timber were protected, and 3.4 million cubic feet of wood were harvested. Trees in recreation areas and forested communities were also treated.

Southern pine beetles kill trees in groups, called spots. Spots are treated by cutting the infested trees and a buffer strip of unattacked trees to prevent the spot from enlarging. In 1986, approximately 32,000 spots on 86,000 acres were treated. About 325 million cubic feet of merchantable timber were protected, and an additional 129 million cubic feet of timber were salvaged. The method of cutting trees rather than applying insecticides was used on 99.6 percent of the treated acreage.

Dwarf mistletoe infections retard growth, reduce wood quality, and kill trees. Conifer trees infected with dwarf mistletoe were treated by silvicultural methods on 13,420 acres. Removal of 2.4 million cubic feet of infected trees protected another 4.2 million cubic feet of wood.

Mountain pine beetles kill high-value trees in recreation and timber-producing areas. Suppression projects were conducted on 52,000 acres of Federal, State, and private lands, protecting 13 million cubic feet of timber. An additional 4 million cubic feet of timber were removed. Nonchemical methods were used on 95 percent of the treated acreage.

Pest Management Special Projects

Special projects were conducted to acquire pest-impact information, improve existing technology, and transfer new technology.

Projects included production of a virus to treat the Douglas-fir tussock moth, participation in the Cooperative Maryland Gypsy Moth IPM Project, and continued support of the National Agricultural Pesticide Impact Assessment Program (NAPIAP).

The Maryland IPM project, begun in 1982, evaluates treatment strategies on 1.8 million acres of hardwoods. NAPIAP projects provide pesticide benefit and risk information to the U.S. Environmental Protection Agency (EPA). In 1986, NAPIAP efforts included 18 projects covering various pesticides and three general studies.

Additionally, 127 Federal employees were trained in the proper application of pesticides in accordance with the Federal Insecticide, Fungicide, and Rodenticide Act of 1978.

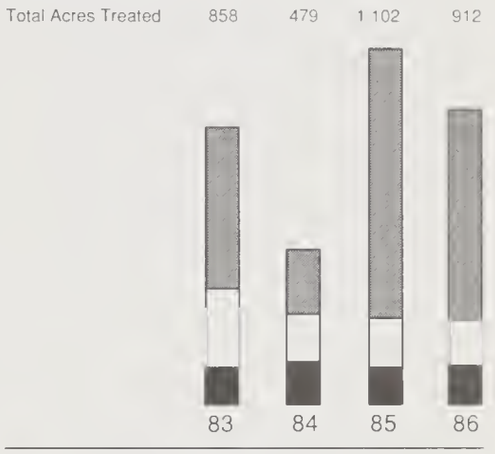
Pesticide Use

Pesticides are one component of IPM. They are used to prevent and suppress insect and disease outbreaks, reduce unwanted vegetation, and control animals that cause damage. Pesticides are prescribed after thorough environmental analyses determine that their use is appropriate. Only chemicals registered by the EPA are used.

In 1986 about 911,902 acres of NFS lands were treated with pesticides, including 141,147 acres for vegetation management, 645,305 acres for insect and disease prevention and suppression, and 125,450 acres for animal control and other minor uses. These figures represent pesticide applications on less than 1 percent of the total acreage of National Forests and Grasslands.

Table 54 summarizes all pesticide use on National Forests and Grasslands in 1986.

Pesticide Use on National Forest System Lands



(Thousand Acres Treated)

	83	84	85	86
Insect and Disease Prevention and Suppression	497	196	834	645
Vegetation Management	245	142	151	141
Animal Damage Control	116	141	117	125

Note: Numbers may not add due to rounding.

FOREST MANAGEMENT AND UTILIZATION

In the United States, demand for forest products is expected to double by 2030. To meet this demand, it is critical that productivity of private nonindustrial forest lands be increased. The objective of the programs described below is to provide assistance toward meeting this need.

Forest Management

The Forest Service provides technical and financial assistance to State forestry organizations, who in turn provide technical advice to private forest landowners to manage the forest resources and improve the productivity of nonindustrial private forest lands.

State foresters, in cooperation with the Forest Service, developed forest-management plans for 3.8 million acres of nonindustrial private forest land in 1986. Reforestation was accomplished on 667,177 acres, 282,389 acres received timber-stand improvement treatments, and 137,753 landowners received professional forestry technical assistance.

Utilization and Marketing

Sufficient changes have been made in the scope and emphasis of the Forest Products Utilization program to justify changing its name to Utilization and Marketing (U&M). This has been done to better reflect the changing needs of the State forestry organizations and other constituencies, and congressional interest in marketing.

The emphasis in 1986 was on developing new harvesting programs that will increase logging and sawmill efficiency and reduce wood waste. One example is a computer program that administrators of National Forest timber sales can use with logging contractors to increase productivity and income. Although this program is still in the testing stage, preliminary results indicate that its use can increase the volume of timber harvested by over 10 percent. Such an increase could translate into millions of dollars in the test Region alone. Programs such as this one tie in with efforts to better utilize our forest resources and to reduce the cost of removing logging residue prior to replanting or seeding cutover land.

State and Private Forestry continues to work intensively with State Foresters and other agencies to increase the export of forest products and to promote development of those depressed areas where there is potential for increasing employment in the forest-products industry. Introducing new technologies that make better use of underutilized species and small and poor-quality logs of high-value species is key in this effort. This activity creates jobs in local communities, improves the residual forest for future generations, and makes intensive management of the forest resource more attractive. Although this marketing program is modest in scope, it has resulted in several major projects aimed at bringing together wood and wood-products buyers and sellers. For example, the Forest Service cosponsored four workshops to show wood-industry representatives how to become involved with exporting and why they should give the possibility of entering into the export business serious consideration.

Efforts to introduce new technologies for the construction of timber bridges on rural and secondary road systems are progressing quite well. Through a Transportation Research Board symposium on timber bridge design, a state-of-the-art report was issued. A timber bridge seminar was held by State and Private Forestry in the Pacific Northwest last spring, and others are planned for 1987. The Department's Office of Transportation has been helpful in this effort, and the Federal Highway Administration has lent its support as well.

Seedlings, Nursery, and Tree Improvement

For the fourth consecutive year, the Nation has broken all previous records for planting forest trees. Tree seedling production for 1986 may go over the 2 billion mark for the first time in history. Approximately 86 percent of tree plantings in 1986 were on private lands, primarily in the South. The Conservation Reserve Program established as part of the Food Security Act of 1985 (see discussion under "Forestry Incentives") is expected to increase forest tree-planting efforts even more. As an example, the State of Georgia produced 121 million seedlings in 1986 and has a goal of 200 million for fiscal year 1987.

The nursery and tree-improvement program provides technical and financial assistance to States for upgrading the quality of seedlings in their nurseries. This assistance is aimed at those long-term investments and activities that lead to more productive reforestation of non-Federal lands at a reasonable cost.

Urban and Rural Community Forestry Assistance

The urban and rural community forestry program focuses on providing a better quality of life through the management of trees, forests, and associated resources in and near rural and urban communities. It is estimated that homeowners who plant trees and shrubs increase their property values by 15 to 20 percent. Our urban forests are valued at over $25 billion. This program accomplishes its task by providing technical assistance to State forestry agencies. Target audiences are planners, developers, builders, city foresters, citizen groups, tree service companies, forestry consultants, and homeowners.

Throughout 1986, the Forest Service provided leadership and worked with 20 associations, representing approximately 260,000 members, to promote the concept of urban forestry. Examples of the most successful partnerships are those with the American Forestry Association, the National Urban Forestry Council, and the National Association of State Foresters.

During 1986, the Forest Service also provided technical assistance to State forestry organizations. Federal funding to States was about $1.2 million for national urban forestry activities. These funds provided technical assistance to 5,900 projects. Here are some examples of ongoing projects in States with urban forestry programs.

- The City of Portland, OR, has programs committed to the protection and care of its tree resources. Portland's urban forests include 8,000 acres of parkland and 1,700 miles of streets planted with over 200,000 trees.
- A sawmill has been built in Philadelphia to utilize diseased and pest-infested trees removed from Fairmont Park. The city also uses park lumber to employ underprivileged teenagers in making banisters, shelving, and molding for use in housing rehabilitation.
- The State of Illinois has funded a cooperative education project that developed teaching assistance packets, one of which is dedicated to a bicycle trail in northeastern Cook County.
- The State of Georgia has hired eight urban foresters, primarily for shade-tree diagnosis and evaluation. In addition, Georgia has developed a series of urban forestry films and slide tape programs for educating the general public.
- Coeur d'Alene, ID, received the "Tree City USA" award in 1986. The city completed several beautification projects, developed a comprehensive tree ordinance, conducted street inventories, and participated in the annual Arbor Day festivities.

Statewide Forest Resources Planning

The Forest Service assisted States in a systematic process of forest resources planning, providing funding and technical assistance for specific projects. Federal assistance to States concentrated on identifying ways to use State forest resources for economic development. The Forest Service worked with States to identify their program priorities and alternatives for implementation. Linking State forestry planning and programs to the State's budgeting process was emphasized.

Forty-four States have completed plans. Most of those States are currently implementing or updating existing plans. The Forest Service has served as a catalyst, helping to develop useful plans that improve forest production and management within the States. The following 1986 accomplishments provide examples and encouragement to other States to strengthen and improve their planning processes:

- Minnesota published "A Model for Implementation of a Statewide Forest Resources Plan," which outlines their management system for program planning, operations, reporting, and analysis. This State is implementing its forest resources plan using this improved management system. Objectives identified as priorities in the plan are being used in drafting their budget narratives.
- In Iowa, the designation of the Loess Hills Pioneer State Forest marked a significant expansion of Iowa's forest system. This expansion became possible through the identification in the State's 1985 Forest Resource Plan of a need for more public forest land. As a result, a portion of Iowa's lottery receipts has been earmarked for the expansion of State forests.
- Vermont's State Forest Resources Plan was the driving force for their Governor's conference. Governor Madeline M. Kunin stated that the purpose of the conference was to set strategy for achieving the goals and objectives of the draft Forest Resources Plan. The Governor's Forest Resources Advisory Council will monitor the progress of the organizations assigned responsibility for achieving plan implementation.

- Virginia completed its State plan and a comprehensive economic study, highlighting the importance of the forest industry to the State. The Study pointed out how Virginia's forest resource:

  - supports one of the largest manufacturing industries in Virginia in terms of employment and contribution to gross State product, and

  - is the source of 9 percent of school budgets—"No industry is as important to Virginia's school system as the forest industry."

  After examining the State plan and its economic study, Virginia's Legislature elevated the State's Division of Forestry to Departmental status.

- Arkansas published a State Forestry Commission plan in 1983. The recent Governor's Economic Development Forum on Arkansas' Forestry Future was an important step in revising and broadening their planning approach. State and Private Forestry played a key role in staging this forum, coordinating with the State to identify their program priorities and alternatives for implementation.

- In Oregon, a key benefit of Statewide forest resource planning is the improved relationship between the Oregon State Forestry Department, the Forest Service, and the Bureau of Land Management. Through this Statewide forest planning effort, the directors and key planning staff of these three Agencies came together to discuss mutual problems in several consensus-building meetings. As a result, communication and cooperation have been enhanced.

- Planning in Alaska prompted the Governor to appoint a timber task force to define the problems confronting the wood-products industry and to make recommendations for their solution. Planning also contributed to establishment of an Office of Forest Products in the Department of Commerce and Economic Development and to the establishment of two large State Forests. The planning process has shown that although Alaska has approximately 16 percent of the forested land in America, it harvests less than 1 percent of our timber.

Technology Transfer

The technology transfer program provides direction and guidance to all units of the Forest Service on how to transfer new technology and information to potential users. The program facilitates the application of forestry information to optimize the use, management, and protection of the Nation's forest resources. Here are some examples of technology transfer projects in 1986.

- TTMPCP (Total Tree Multi-Product Cruise Program) is a computer program that accepts standard cruise data and generates estimates of the weight and volume of all stand products: veneer logs, sawlogs, pulpwood, and fuelwood. Since 1984, the program has been transferred to over 100 public and private land-management organizations. The users include State service foresters and utilization specialists, industrial land managers, consulting foresters, research foresters, and university teaching staffs. Talks, demonstrations, and workshops have been used by the Forest Service to transfer the program to users. Nine workshops were held in Florida, Georgia, Virginia, Mississippi, and Missouri.

- "Ivy Block," an aerosol poison oak/ivy preventative developed by the Missoula Equipment Development Center, is now being transferred throughout the country. Ivy Block is a specially processed organophilic clay that has an excellent affinity for urushiol (the allergen in poison oak/ivy sap). When applied to the skin, it binds up the urushiol. It helps to solve a longstanding and costly problem that hindered field and fire personnel sensitive to these plant poisons. Many Federal and State agencies are now using Ivy Block, which has received national publicity.

- A research chemist at the Forest Products Laboratory received the USDA Superior Service Award for the successful transfer of knowledge concerning the establishment of a new industry in the United States--the growing of edible Shiitake mushrooms. As a result, over 200 individuals in 10 States have started Shiitake cultivation on hardwood logs. America now has a share in this $1.3 billion-a-year industry.

Bicentennial of the U.S. Constitution

September 17, 1987, marks the 200th birthday of the signing of the U.S. Constitution. The Forest Service has assumed an active role with the Commission on the Bicentennial of the United States Constitution chaired by retired Supreme Court Chief Justice Warren Burger. We are participating on both the Federal Interagency Task Force for the Bicentennial and the Commission's Private Programs Division. Most of our efforts have been directed toward a Commission project called "Plant A Living Legacy to the U.S. Constitution." The goal of this project is to encourage communities and private citizens to plant trees and gardens to honor the Constitution. Numerous organizations and agencies, including the American Forestry Association, the American Association of Nurserymen, the National Arbor Day Foundation, the American Society of Landscape Architects, the American Horticultural Association, the American Association of Retired Persons, the National Park Service, and the Federal Highway Administration, are working on this project.

On September 17, 1986, 1 year before the bicentennial of the signing of the Constitution, the Forest Service helped kick off the Plant a Living Legacy project with a well-attended media event held at Constitution Gardens in Washington, DC. Lady Bird Johnson, Chief Justice Burger, Chief Max Peterson, Smokey Bear, Woodsy Owl, and others participated in the ceremony.

Wielding those shovels are retired Chief Justice of the Supreme Court Warren Burger and Lady Bird Johnson, the First Lady who made beautification of America's public spaces her personal cause. They are planting this maple to celebrate the 200th anniversary of the signing of the U.S. Constitution.

Taxation

The President signed the Tax Reform Act of 1986, which will have a major effect on forestry. Capital gains rates for timber and all other capital assets will be eliminated after 1987. Although it had been proposed that the expensing of timber-management costs and the preproductive period expensing of interest and taxes be eliminated, these provisions were retained subject to passive loss rules. These rules still have to be clarified. Additionally, the investment tax credit and amortization of reforestation costs were retained.

In 1986, State and Private Forestry kept the States informed of proposed tax changes. A technology transfer plan was developed in the Southern Region for transferring forest tax information. Analysis of provisions that affect forestry will continue in 1987.

SPECIAL PROJECTS

Boundary Waters Canoe Area

The Boundary Waters Canoe Area (BWCA) Wilderness Act of 1981 authorizes cooperation with the State of Minnesota in a forest-management intensification program to be applied on forest lands owned by the State, its counties, and its private citizens. The purpose is to mitigate the loss of timber production caused by incorporating forest lands into the BWCA. Federal funding is authorized for this program through 1990.

Accomplishments in 1986 with $2.85 million of Federal funds and $750,000 of State matching funds included 21,645 acres of reforestation, 10,606 acres of timber-stand improvement, production of 23.13 million tree seedlings, marketing and utilization assistance for 3.29 million cubic feet of timber products, 643 miles of road reconstruction and maintenance, general forest-management assistance on 12,678 acres, and forest inventory work on 300,000 acres.

Pinchot Institute for Conservation Studies

The Pinchot Institute for Conservation Studies is housed in the Grey Towers estate, former home of the first Chief of the Forest Service, Gifford Pinchot. In 1986, Grey Towers celebrated its centennial, and the "Center of Excellence" concept for the Institute was continued. Numerous conferences, seminars and workshops were conducted in the superb atmosphere that characterizes Grey Towers.

Workshops held at Grey Towers in 1986 included heritage awareness training for senior executives and the Forest Service's Management Policy Seminar. Among the many groups that met at the Institute was a special task force formed to review proposed tax changes and their effects on the management and productivity of the Nation's forest resources.

The Grey Towers Center also hosted natural resource leaders from 30 nations for the concluding program of a 30-day Agency for International Development (AID) tour of forest management and administration in the United States. Many of the forestry leaders who attended are in ground-breaking roles for their countries similar to Gifford Pinchot's role in this Nation at the turn of the century.

During 1986, the Institute staff gave approximately 900 interpretive tours of the mansion and grounds to a total of almost 11,103 visitors. Other visitors came to the site to attend concerts, lectures, conferences, exhibits, seminars, workshops, or centennial activities. Total visitation exceeded 25,000 persons.

Burton-Santini Act

The Burton-Santini Act (P.L. 96-586) authorizes the Secretary of Agriculture to make financial assistance grants within the Lake Tahoe Basin for the purpose of reducing soil erosion and water pollution. The program is done in cooperation with Placer and El Dorado Counties, and the city of South Lake Tahoe, CA, as well as Douglas and Washoe Counties, NV.

In 1986 a total of $1.4 million in grants was awarded to local governments for 12 new projects. These Federal funds were matched by $3.6 million of State and local funds.

Two previously funded projects were completed in 1986. Significant accomplishments included restoration of a large dump and waste area in Douglas County, NV.

OTHER PROGRAMS

Forestry Incentives

The Forestry Incentives Program (FIP) and the forestry practices of the Agricultural Conservation Program (ACP) provide financial incentives for owners of nonindustrial forest lands to increase timber production through reforestation and timber-stand improvement. These programs are important incentives in meeting the Nation's wood supply needs, accounting for nearly half the total reforestation on nonindustrial private lands.

In 1986, 201,154 acres were treated under FIP and 104,641 acres under ACP. This includes 174,306 acres and 86,392 acres of reforestation for FIP and ACP, respectively. Federal cost-share expenditures for FIP and ACP totaled $9,937,742 and $5,330,090.

The Food Security Act of 1985 (1985 Farm Bill) established a Conservation Reserve that removes highly erodible cropland from agricultural production. Participants receive annual rental payments for 10 years to keep land out of production. They also receive up to 50 percent of the cost of establishing permanent cover on these lands. During the three signups conducted during 1986, the USDA accepted 8.9 million acres for the Conservation Reserve.

Tree planting on these lands totaled 582,000 acres, or 6.5 percent. State Foresters, through the State and Private Forestry program, provided technical assistance to landowners to carry out tree-planting plans. Currently, tree planting under the Conservation Reserve is equivalent to nearly 70 percent of all planting on nonindustrial private forest lands. This may prove to be the largest tree-planting program in history.

Resource Conservation and Development

The Forest Service is responsible for the forestry provisions of the Resource Conservation and Development Program, which is broadly administered by the Soil Conservation Service (SCS). In 1986, funds allocated to the Forest Service totaled $693,000 for 45 of the authorized 194 project areas throughout the United States. In 1986, funds were used:

- to finance fuelwood harvesting educational programs for woodland owners in Wisconsin,
- to sponsor consultant foresters working with vocational training institutes to encourage small-scale harvesting operators in Maine,
- to promote better utilization of forest products in Vermont and Illinois,
- to utilize small-diameter hardwoods,
- to market New Mexico Christmas trees,
- to plant trees to stabilize eroding marginal land in Georgia and Alabama, and
- to provide technical assistance to rural communities in North Dakota for tree care and managing community forests.

Cooperative Watershed Activities

The Forest Service provides technical leadership under the forestry aspects of the small watershed (PL 566) and flood prevention (PL 534) programs, emergency watershed protection, and river basin studies. These programs are administered by the SCS.

In 1986, $932,000 in river basin funds supported 45 studies to assess forestry-related aspects of existing flood damage, sedimentation, and soil depletion issues.

Planning assistance on 58 small watershed projects with a total cost of $193,000 was accomplished in 1986.

A total of $577,000 was distributed for land treatment measures on 70 small watershed projects. These funds paid for land stabilization practices on critically eroding areas and financed State foresters who provided technical assistance on forestry practices.

Stabilizing critical areas of erosion on the Lyndon B. Johnson National Grasslands in north-central Texas was just part of our watershed enhancement work in 1986.

Flood-prevention activities continued on the six remaining watersheds. A total of $2.25 million was allocated for erosion control and flood prevention. Activities included stabilizing critical areas of erosion on the Lyndon B. Johnson National Grasslands in the Trinity River Basin, Texas. This Forest Service effort has stabilized 1,800 acres of land to date.

The SCS allocated $1.9 million to the Forest Service in 1986 for emergency watershed-protection projects. Hazards to life and property were treated on National Forest lands primarily in California, Utah, Virginia, and West Virginia. These funds were also used to treat private lands in Oregon and Idaho, where burned areas could be treated in conjunction with National Forest System land rehabilitation efforts.

Cooperative watershed activities included participation in State programs such as the recent erosion-control programs in the Southeast. Technical assistance was provided to several States. As a result, States like Mississippi established cost-sharing programs that expanded the application of conservation practices.

Idaho was assisted in establishing and training a staff specialist position in soil and water. As a result, the State can provide technical information to landowners on forestry-related erosion control practices.

Rural Community Fire Protection Program

The Rural Community Fire Protection Program (RCFP) provides technical and financial assistance to train, organize, and equip rural fire departments. The assistance is aimed at small communities, mostly under 10,000 population, to provide a definitive level of fire protection. Funds for this program are administered by the Forest Service, provided by Farmers Home Administration, and matched by local communities. In 1986, 1,729 applications from rural communities across the Nation were funded, primarily for training and equipment.

Forest Research

Forest Research

INTRODUCTION

The Forest Service research program develops scientific and technical knowledge to enhance the economic and environmental values of America's 1.6 billion acres of forest and rangelands.

Research is generally long range and high risk, covering a wide spectrum of biological, physical and social sciences disciplines. The program as a whole supports the mission and goals of the President, the Department of Agriculture, and the Forest Service.

Most of the research is regional in scope, and some is national and international, extending to nearly every major terrestrial ecosystem. The geographic range of the program is from the tropics to the Arctic and from Hawaii and territories in the Pacific to Puerto Rico in the Atlantic.

Research is conducted through eight regional Forest and Range Experiment Stations and the Forest Products Laboratory at Madison, WI. More than 2,800 studies are in progress. Approximately 800 scientists are stationed at 76 locations throughout the States, Puerto Rico, and the Pacific Trust Islands.

The research program is planned and coordinated with related efforts at the 61 forestry schools and the agricultural experiment stations of Land Grant institutions throughout the United States. Forest Service scientists also work closely with researchers from other public agencies and industries. Many of the scientific and technical accomplishments described in this report will be used to help manage our National Forests and Grasslands. New technology will be transferred to land managers, Federal, State, and local policy makers, and to the industries through publications, symposia, workshops, and direct public communications (table 64).

The research program also supports international forestry through cooperation with other Federal agencies, the United Nations, and bilateral arrangements with a number of foreign countries.

The 1986 research program emphasized development of new and better ways to increase the production of market resources and other forest-related values on forests and rangelands, and new ways to protect and enhance the environment and reduce operating costs. Much of the research was directed toward solving problems relating to intensified, multiple-use management of forest resources. A program of basic research was maintained to generate new knowledge in key problem areas in the biological, physical, and social sciences.

In 1986 emphasis was placed on research that would (1) improve efficiency of natural-resource management and production systems, (2) strengthen and support Federal action programs and international initiatives, (3) protect the natural-resource base, and (4) serve critical consumer interests. Priority was given to research programs that increase forest productivity and timber utilization, reduce impacts of mineral extraction activities, enhance forest protection, and develop technology to solve problems in multiple-resource management, basic biology, and atmospheric deposition.

In 1986 research appropriations totaled $120 million, approximately 14 percent of which supported cooperative studies with colleges, universities, other research organizations, and industry (tables 61 through 63). An additional $6.5 million was transfered to the Cooperative State Research Service for the administration of the Forestry Competitive Grants Program. In addition, the Forest Service received $5.7 million from outside sources (table 61).

LAND AND RESOURCE PROTECTION RESEARCH

Fire and Atmospheric Sciences Research

The objectives of this activity are to (1) develop improved knowledge of the initiation, behavior, and effects of fire in forest and range environments; (2) apply that knowledge by developing better methods of preventing and controlling wildfires and using prescribed fires for enhanced forest resource protection and production; and (3) better understand atmospheric effects on forest productivity and health, and biosphere/atmosphere relationships. Examples of 1986 research accomplishments follow.

Experiments at the Intermountain Fire Sciences Laboratory have told us a great deal about how steady-state line fires spread at ground level--the burning conditions for most forest and range fires.

- Two automated fire behavior/weather-related systems developed by the Forest Service will help make more reliable predictions of the behavior of fire in wildland areas. The more we know about fire behavior, the better we will be equipped to effectively use prescribed burning to enhance wildland resource values in a safe and environmentally sound manner.

- We have developed computer wind models that let us predict the spread of the gypsy moth from newly discovered infestations. Wind information is coupled with what we know about moth dispersal, and the model displays the probable concentrations of moth larvae on a map of the outbreak area.

- To keep prescribed fire in our kit of available management tools, we need better understanding of how to minimize resulting smoke and how subsurface soil temperatures are affected by flame and soil characteristics. This year we discovered what combinations of harvesting practices and weather produce the least smoke for a given prescribed burning objective. We also developed a soil-heating model that will enable us to predict the magnitude of subsurface temperatures during wild or prescribed fires, based on data about the flames themselves and soil characteristics.

Forest Insect and Disease Research

The objectives of this activity are to develop technology that (1) prevents or reduces forest and rangeland damage by insect and disease pests and (2) protects wood in use and storage from insects and decay. Results are used to develop environmentally safe and effective strategies for pest management, and to help integrate pest management with forest resource management. Examples of 1986 accomplishments follow.

- Twenty years of research on mountain pine beetle epidemics has led to the development of (1) methods to identify stands susceptible to beetle attack, (2) techniques to predict lodgepole pine losses caused by the beetle, and (3) silvicultural prescriptions to help prevent or reduce these losses. We have developed computer models to predict the rate and amount of tree loss, as well as guidelines for changing tree and stand conditions to reduce the likelihood of MPB infestation.

- A cooperative team of researchers from our Forest Products Laboratory and the U.S. Navy has found a new method for eradicating decay fungi deep within structural timbers. The method, which involves drilling holes and exposing the wood to fumigants, will extend the service life of structures and avoid expensive repairs or replacement at inflationary costs.

- Agency scientists have devised an Integrated Pest Management Decision Process to help managers (1) determine the likelihood of gypsy moth infestation, and (2) estimate which stands are likely to sustain the heaviest defoliation. If managers use the accompanying decision-support system, they will be able to select the gypsy moth treatment appropriate for their management situation while protecting the environment.

Forest Inventory and Analysis

This activity provides comprehensive, continuing information and analyses of the characteristics of forest land resources of the United States. Forest inventory data, monitoring surveys, and results of analyses are used by forest industry, financial consultants, and State resource planners as a basis for industry expansion decisions, financial investment analysis, State forestry programs, and public and private forest policies. Survey activities in 1986 include:

- Forest inventory reports were issued this year for California, Louisiana, Montana, New Hampshire, Vermont, Virginia, and Wisconsin. We also published timber-production reports on veneer log use, characteristics of private landowners who own timber, and improved technologies for making the timber-inventory process more efficient.

- "Operability" is the relative ease or difficulty of managing or harvesting timber because of physical conditions in the stand or on the site. The Agency has developed a way to evaluate operability using information already collected during Statewide forest inventories. This method will let users determine the area of timberland and volume of timber by operability class and its distance from wood-using centers, thus enhancing their ability to make harvesting decisions.

- To satisfy the concerns of Idaho timber owners about proposed National Forest timber-cutting plans, we related our proposed harvest levels to potential timber supplies from other ownerships. The analysis identified the supply roles for timber from other private nonindustrial, State, and other public owners that would maintain the current contribution of the timber industries to Idaho's economy.

Renewable Resources Economics Research

The objectives of this activity are to develop and apply methods for analyzing the responses of domestic and international forest-products markets to economic and institutional forces and for structuring economically efficient forest-management activities.

Research contributes directly to National Forest management decisions and the design of both public and private forest-management programs. Results are also used by individual landowners and forest-products processing firms to manage their resources efficiently. Examples of 1986 accomplishments follow.

- The Forest Service has responded to America's changing tax environment by conducting a comprehensive, continuing forestry tax research program at the Southern Station. We are analyzing the management and investment responses of individual forest landowners and the forest industry to tax changes that affect forestry decisions.

- A new publication by investigators at the Rocky Mountain Station--"Toward an Improved Framework for Estimating RPA Values"--identifies important issues and provides new concepts for assigning economic values to both tangible and intangible forest products. Results documented in this publication will help us develop the 1989 RPA program.

- How changes in the South's forest-products industry in the 1970's affected employment, earnings, and productivity is the subject of a series of analyses by Forest Service and cooperating university economists. The studies found that the industry has grown substantially over the last decade. Also, five Southern States can boast forest-products industries whose average productivity exceeded the industry average for the Nation.

RENEWABLE RESOURCE MANAGEMENT AND UTILIZATION

Trees and Timber Management Research

The objectives of this activity are to (1) develop improved silvicultural alternatives and management guidelines needed to increase the productivity and multiple-use benefits of forest lands, (2) maximize the growth and quality of trees, and (3) maintain land productivity. Timber management research ensures that the information and technology needed to achieve full productivity are developed and promptly made available. Examples of 1986 accomplishments follow.

- The newly published proceedings "Guidelines for Managing Immature Appalachian Hardwood Stands" includes recommendations on how to manage sapling, pole, and small sawtimber stands with emphasis on how past history has affected present stand composition. Many stands in this region will benefit from early thinnings to remove poor-quality and smaller trees.

- Rocky Mountain Station scientists have developed multiple guidelines to help managers convert old-growth or mixed-growth stands into managed stands. These guidelines, released in three reports, consider stand succession, windfall risk, and insect and disease susceptibility. They also recommend cutting practices that help integrate timber production with increased water yield, improved wildlife habitat, enhanced opportunities for recreation, and scenic values.

- Forest Service researchers have found that production of seed for reforestation can be greatly increased by locating pine seed orchards in warmer climates. And by varying the timing and spatial patterns of seedlings from different genetic groups within a species, managers can achieve almost any pattern of genetic diversity in either pure or mixed stands.

Watershed Management and Rehabilitation Research

The objectives of this activity are to develop and test new, cost-effective methods for (1) rehabilitating lands disturbed by surface mining and (2) protecting, managing, and improving forest and rangeland watersheds. The research helps planners and managers meet long-term water quality and flow needs, rehabilitate surface-mined lands, and determine the relationships between land uses and water quality and flow. Examples of 1986 accomplishments include:

- To leave more water for streamflow and protect Arizona soils from erosion, we investigated converting chaparral shrubland to grassland. We found that changing to grass could increase stream flow by 72 percent without significant danger of flooding surrounding areas.

- Recent research developments indicate that low-cost, low-maintenance forest roads are consistent with protection of water resources. In Idaho, we found that road design has little effect on erosion; what matters is the stage of construction when storms occur. In West Virginia, we found that using at least 3 inches of gravel decreases soil losses and improves road utility. In North Carolina, we achieved better control of sediment deposition by using narrower filter strips to trap sediments along roadsides.

Forest roads do not always have to be expensive to prevent serious sediment problems in streams. We have learned that something as simple as a dip in the road can substitute for much more costly design features.

- To reclaim surface mine spoils, we found forest topsoil, which is full of seeds, superior to either a commonly recommended ground-cover mix or to a combination of forest soil and the mix. The natural seed-bank community from the forest topsoil produced greater plant biomass and held onto more fertilizer-related minerals, too.

Assigning economic values to tangibles from our wildlands, like the forage available on a specific parcel of rangeland, is relatively easy. Economists at the Rocky Mountain Station have recently published a major book on how to estimate the values of intangibles such as outdoor recreation and esthetics.

Our research has indicated that chinook salmon prefer to live in the undercut banks of streams. Here, researchers have placed artificial shelters in a stream to simulate undercut banks where none occur naturally.

Wildlife, Range, and Fish Habitat Research

This research develops knowledge and technology for (1) maintaining or improving wildlife and fish habitat; (2) improving soil stability, vegetative cover, and the condition of rangeland; and (3) integrating wildlife, fish, and livestock with other forest and rangeland uses. Research results help managers understand the complex relationships among habitat quality, growth and response of vegetation to defoliation, other land uses, and wildlife and fish populations. The goal of this research is to ensure diverse, well-established habitats and to conserve and improve productive rangeland ecosystems. Examples of 1986 accomplishments follow.

- Researching wildlife in the managed forest has revealed that (1) we can predict the response of ovenbird and wood thrush to forest-management activities; (2) bird census counts do not vary during the first 5 hours of the morning, so census timing can be adjusted to accommodate workers' schedules; (3) to keep up squirrel populations near clearcuts, foresters need to leave uncut streamside strips at least 100 feet wide.

- In examining how natural obstructions in stream channels affect the survival of fish species such as coho and chinook salmon and steelhead trout, we found that large obstructions stabilize the channel and create pools where larger fish reside during the summer. This research also provided optimal designs for artificial obstructions so fisheries managers can modify the natural habitat to favor particular species.

- Our new book "Wildlife Habitats in Managed Rangelands," written in cooperation with the Bureau of Land Management, (1) develops a common understanding of wildlife habitats of managed rangelands, (2) provides a system for predicting the impacts of range-management practices on wildlife, and (3) shows how the system can be applied to a specific area--in this case, the Great Basin of southeastern Oregon.

Forest Recreation Research

The objectives of this activity are to provide land managers with the technology to supply more and higher quality outdoor recreation opportunities, and to develop knowledge to manage vegetation in and near urban areas for optimum economic, social, and environmental benefits. Examples of 1986 accomplishments include:

- Working with Southern Illinois University, we constructed a survey to identify which attributes of bicycle trails are important to riders in greater Chicago's forest preserves. Next, we developed a model to predict user satisfaction with a trail, given characteristics such as its surface, length, distance from the cyclist's home, and terrain. We found that trail surface and distance from home are particularly important to bicyclists.

- Residential trees can be planted in such a relation to particular homesites that resulting sunlight and shade control greatly reduce energy costs. Two new computer programs--SOLPLOT and SPS--graphically illustrate shade location and show energy saved by planting trees in various places. They are now available for either mainframe computers or micros.

Forest Products and Harvesting Research

The objectives of this activity are to (1) provide technology to harvest and utilize timber more efficiently; (2) develop timber-harvesting and -transporting systems that are economical and environmentally acceptable; (3) improve the performance of wood products; (4) expand opportunities for wood-products exports; (5) reduce waste, costs, and energy consumption in wood processing; and (6) facilitate forest management and environmental protection through improved harvesting and use of wood. Examples of 1986 accomplishments follow.

- Cull trees, forest residues after harvesting, and mill wastes can be turned into valuable products when utilized to produce flakeboard, particleboard, and oriented strand board. Our new publications documenting techniques for producing composite panels from low-value trees and residues have transferred new technology to user groups at mills in New England, the East, the South, and the Rocky Mountain areas.

- SOFORM--a chemical treatment that imparts wet-stiffness characteristics to paper and paperboard, can improve paper's dimensional stability by about 80 percent, making it almost as stiff wet as dry. SOFORM should enable builders to construct emergency shelters for disaster victims and wall and ceiling panels from paperboard products--a cost- and time-saving possibility not feasible in the past due to paper's susceptibility to water damage.

At the Forest Products Laboratory, our scientists have found that they can significantly increase the dimensional stability of wood for furniture and millwork applications by chemically modifying its cell-wall polymers at the microscopic level. The process involved has very little effect on the strength properties of the resulting wood material and causes almost no color change in the finished product.

- Results of 60 years of continuing research are brought together in Agriculture Handbook 647, "Finishing Wood Exteriors: Selection, Application, and Maintenance." This 56-page handbook for do-it-yourselfers and professionals discusses basic characteristics of wood and wood-based products, how to apply various exterior wood finishes, and how to diagnose and correct finish failures on wood in service.

INTERNATIONAL FORESTRY

The objective of the Forest Service International Forestry Staff (IF) is to provide leadership, coordination, and direction for Forest Service involvement in forestry worldwide. Examples of 1986 accomplishments follow.

- We provided leadership and staff support for 12 cooperative research projects in 6 countries addressing new technologies in wood utilization, tree genetics, forest protection, and regeneration practices.

- We undertook 20 science and technology exchanges with 11 countries, including 2 reactivated programs with the Soviet Union and the People's Republic of China. Particular benefits include acquisition of new tree germplasm, data on atmospheric deposition, and information on biological control of gypsy moth.

- We provided practical training programs at Forest Service units across the country for more than 260 international visitors in forestry and related fields. Visitors included students and professionals from more than 45 countries worldwide. The Volunteer Program was broadened to include selected international visitors, with visa authorization granted to the Forest Service.

- The Forest Service and The University of Michigan, with financial support from the U.S. Agency for International Development, sponsored the Second International Seminar on Forest Resource Administration and Management, held in October, 1985, for 26 senior public forest-resource administrators from 24 developing countries.

- The Forest Service continued to support the Man and the Biosphere Program and to benefit from its projects. Some 21 funded and completed projects dealing with tropical forestry were prepared for publication.

- Cooperation with international organizations continued on a high level. In particular, Forest Service delegates participated in the meetings of the Committee on Forestry and the North American and Latin American Forestry Commissions of the Food and Agriculture Organization of the United Nations (FAO). The Forest Service was also a key organizer of and active participant in the 18th World Congress of the International Union of Forestry Research Organizations (IUFRO), held in Ljubljana, Yugoslavia, in September of 1986.

Cooperation with the U.S. Agency for International Development (AID) continued to grow and to benefit AID, the Forest Service, and tropical countries. Most cooperation with AID is managed by the Forestry Support Program, which is a joint effort of the Forest Service, AID, and the USDA Office of International Cooperation and Development. The Forestry Support Program serves as direct technical backstop to AID and the Peace Corps worldwide and helps design, execute, and evaluate a wide range of AID-sponsored forestry activities abroad. Examples this year include:

- Evaluation of a reforestation project in Sudan and agroforestry activities in Haiti and Ecuador;

- Analysis of damage and development of action plan to combat an insect attack on Leucaena in Asia-Pacific countries;

- Assistance to AID to develop a training plan for social forestry projects in India;

- Preparation of a Spanish-language training manual on agroforestry, done in cooperation with the Organization of Tropical Studies and the Center for Research and Training on Tropical Agriculture;

- Special initiatives to promote improved private forest enterprises in developing countries, including a study on the economics of contract reforestation in the Philippines; and publication of a promotional folio on Ecuadorian hardwoods, a profile on the forest industry sector in Bolivia, and a study on private-sector opportunities to improve wood products and tree crops in Senegal; and

- Cosponsorship with the Institute of Tropical Forestry and other cooperators of the Conference on Management of Forests of Tropical America, held in Puerto Rico in September, 1986.

The Forestry Support Program roster of forestry and natural-resource experts has been completely updated and now contains more than 2,200 resumes from the forestry community. It identifies potential candidates for dozens of long-and short-term assignments and alerts target audiences to overseas and domestic vacancies with AID, FAO, Forest Service, CARE, and others directly associated with AID-funded projects.

A major new 1986 initiative with AID was the establishment of the Disaster Assistance Support Program. In cooperation with OICD, this Forest Service program helps AID's Office of Foreign Disaster Assistance in providing emergency disaster relief and training for disaster managers abroad. Major 1986 activities were:

- Training on hurricane disaster management in Antigua and Barbados;

- Evaluation of wildfire and firefighting training needs in Argentina, Costa Rica, and Venezuela; and

- Emergency disaster assistance to five African countries to combat major plagues of locusts and grasshoppers.

Implementation of the cooperative Program for Tropical Forestry in Latin America and the Caribbean accelerated in 1986. This program is a joint effort of the Forest Service's Southern Region and Southern and Southeastern Stations, the Forest Products Laboratory, and International Forestry. With significant funding from AID, a position with State and Private Forestry has been established and filled in the Caribbean National Forest in Puerto Rico to coordinate this program. Assistance and training have been provided to some Caribbean countries already. From the Forest Products Laboratory, a team of tropical forest-products specialists visited various countries in Latin America to identify possibilities for cooperative research and technology transfer.

SPECIAL PROJECTS, COMPETITIVE GRANTS

The objective of the competitive grants program is to develop fundamental knowledge and understanding of wood properties and structures, biological mechanisms of forest organisms, and relationships within forest ecosystems. Congress provided $6,505,960 in FY 1986 for the Forest Service's competitive research grants program in forestry, with funding to be directed at basic research in two areas: (1) Improved harvesting, processing, and utilization of timber resources, with emphasis on chemical, mechanical, and engineering properties of wood and wood materials; and (2) fundamentals of forest biology, including biotechnology.

This competitive research grants program is administered, and funds are allocated, by the USDA Competitive Research Grants Office in Science and Education--the same office administering the agricultural competitive grants program.

Grants are awarded based on a competitive evaluation process used by the National Science Foundation. Requests for proposals appear in the Federal Register after clearance by the USDA Office of the General Counsel and the Office of Management and Budget.

Scientists on leave from their institutions serve as program managers or evaluation panel members. Federal employees serve as associate program managers performing essential administrative tasks.

All qualified scientists in the United States are eligible for grants, including Federal scientists.

A total of 428 proposals, requesting a total of $81 million, were received in competition for the $6.2 million available for grants. Of these, 63 proposals were awarded grants; the average grant was approximately $98,000 and covered a 3-year period.

Grants were awarded in the following fields:

Basic Harvesting Technology

Wood Chemistry and Biochemistry

Physical/Mechanical Properties of Wood and Basic Processing Technology

Structural Wood Engineering

Genetic Structure and Function (including biotechnology and genetics)

Mechanisms of Interactions in Forest Ecosystems

Tables

Tables

Table 1—Summary statement of receipts and expenditures—fiscal years 1985-86

	1986		1985		Percent Change 1985 to 1986	
	Receipts	Expenditures	Receipts	Expenditures	Receipts	Expenditures
	1,000 constant 1986 dollars					
National Forest programs:						
Receipts:						
Cash receipts and appropriation expenditures:						
Sale of timber and use of other forest resources	799,418	0	571,692	0	40	0
Use of National Grasslands and land utilization areas	32,357	0	64,255	0	-50	0
Timber sale area betterment (K-V) 1/	156,092	0	186,107	0	-16	0
Cooperative work for others	43,423	0	38,613	0	12	0
Brush disposal	52,936	0	53,734	0	-1	0
Miscellaneous (sales, rentals, damages, etc.) 2/	12,234	0	6,332	0	93	0
Restoration of forest lands and improvements	176	0	172	0	2	0
Recreation permit sales and fees from designated areas	3	0	2	0	50	0
Timber salvage sales	20,677	0	15,232	0	36	0
Operation & maintenance of quarters	5,352	0	4,854	0	10	0
Subtotal	1,122,668	0	940,993	0	19	0
Cash receipts from NFS lands collected in conjunction with, and deposited to, accounts of other agencies	77,725	0	82,421	0	-6	0
Non-cash income (roads built by timber purchasers)	117,026	0	107,949	0	8	0
Total	1,317,419	0	1,131,363	0	16	0
Expenditures:						
Operating costs	0	1,571,247 3/	0	1,630,665	0	-4
Capital outlay	0	147,430	0	218,842	0	-33
Total	0	1,718,677	0	1,849,507	0	-7
Other Forest Service programs:						
Forest Research programs:						
Forest research	0	122,557	0	118,790	0	3
Research construction	0	824	0	988	0	-17
Cooperative research work	3,001	2,507	1,265	1,224	137	105
Gifts, donations, and bequests for forest rangeland research	25	4	36	9	-31	-56
Tongass timber supply fund	0	1,982	0	1,852	0	7
Energy security reserve	0	-3	0	9	0	-133
Federal photovoltaics utilization program	0	0	0	79	0	0
Subtotal	3,026	127,871	1,301	122,951	133	4

See footnotes at end of table.

Table 1—Summary statement of receipts and expenditures—fiscal years 1985-86—Continued

	1986		1985		Percent Change 1985 to 1986	
	Receipts	Expenditures	Receipts	Expenditures	Receipts	Expenditures
			1,000 constant 1986 dollars			
State and Private Forestry programs:						
State and private forestry cooperation	0	59,376	0	64,464	0	-8
Rural community fire protection	0	3,019	0	3,234	0	-7
Flood prevention and watershed protection	0	2,029	0	1,918	0	6
License programs (Woodsy Owl and Smokey Bear)	96	95	74	33	30	188
Forestry incentives and other programs 4/	0	2,072	0	2,360	0	-12
Subtotal	96	66,591	74	72,009	30	-8
Human Resource programs:						
Job Corps	0	56,448	0	52,166	0	8
Senior Community Service Employment	0	21,782	0	21,638	0	1
Subtotal	0	78,230	0	73,804	0	6
Grand total, all programs	1,320,541	1,991,369	1,132,738	2,118,271	17	-6
Cash receipts distributed to States, counties and Puerto Rico:						
Payments to States and Puerto Rico	0	212,241 5/	0	224,937	0	-6
Payment to Minnesota	0	716 5/	0	716	0	0
Payments to counties, National Grasslands and Land Utilization Areas	0	15,327	0	10,047	0	53
Subtotal	0	228,284	0	235,700	0	-3
Internal equipment and supply service (Working Capital)	87,060	86,898	91,491	81,065	-5	7
Reimbursements for work performed for government and others included above	0	73,416	0	52,396	0	40

1/ K-V = Knutson-Vandenberg
2/ Includes sale of personal property and acquisitions of lands to complete land exchanges.
3/ $18,860,921 in obligations and receivables were inadvertantly omitted, as referred to in table 5.
4/ Includes Resource Conservation and Development, River Basins, and Pesticide Impact assessment funds transferred from ARS. 5/ Due to sequestration in 1986, the Forest Service was directed by OMB and GAO to pay 75 percent of estimated 1986 receipts. In September 1986, payments of an additional $170,517,958 were made to States and Puerto Rico, and an additional $685,015 was paid to Minnesota, making a total of $171,202,973 not included in above table.

Table 2—Summary statement of values and expenditures—fiscal year 1986

Item	Units 1/	Quantity	Average value per unit	Total value
		1,000		Million dollars
Value:				
Minerals				
Common variety	Tons	-- 2/	--	--
Locatable	Tons	--	--	--
Leasable 3/	BBTU	599.4	1,870.9	1,121.4
Timber (excl. free firewood)	MBF	10,966.5	69.03 4/	757.0
Recreation	RVD	182,500.0	7.37	1,345.0
Wilderness and primitive area	RVD	12,000.0	9.70 5/	116.4
Wildlife and fish				
Recreation	RVD	32,000.0	13.72	439.0
Commercial	M Pounds	--	922.21	--
Range	AUM		6.96	
Water	AF-Yield	--	--	--
	AF-Quality	--	--	--
Total value				3,830.8
Expenditures:				
National Forest System				1,718.7
Forest Research				127.9
State and Private Forestry				66.6
Human Resource Programs				78.2
Total expenditures				1,991.4
Net value, total				1,839.4
Net value, National Forest System only				2,112.1

1/ BBTU = billion British thermal units; MBF = thousand board feet; RVD = receation visitor-days; AUM = animal unit month; AF = acre feet.
2/ -- = not available
3/ Oil, gas, and coal only.
4/ Actual value at time of sale.
5/ Exclusive of wilderness, wildlife, and fish.

Table 3—Statement of receipts—fiscal years 1982-86

Receipts	1986	1985	1984	1983	1982
			1,000 dollars		
Receipts from sale and use of forest resources:					
Timber and forest products	**745,132**	514,561	544,265	398,498	251,022
Grazing	**8,617**	9,040	9,618	10,183	12,426
Land uses	**4,073**	3,348	3,442	3,162	2,860
Recreation	**30,275**	30,829	27,541	27,801	25,352
Power	**765**	647	834	733	679
Minerals	**42,913**	77,522 1/	51,649	54,932	57,885
Subtotal	**831,775**	635,947	637,349	495,309	350,224
Receipts from deposits for expenditures on National Forests:					
Timber sale area betterment	**156,092**	186,107	165,463	134,351	77,546
Timber salvage sales	**20,677**	15,232	20,514	14,106	6,822
Brush disposal	**52,936**	53,734	60,290	47,844	29,588
Restoration of Forest Service lands and improvements	**176**	172	160	214	56
Cooperative work	**43,423**	38,613	43,976	33,859	26,254
Operation & maint. of quarters	**5,352**	4,854			
Gifts, donations & bequests	**25**	36			
Subtotal	**278,681**	298,748	290,403	230,374	140,266
Other receipts:					
Misc. (sale, rents, etc.)	**10,644**	5,236	14,844	7,506	4,724
Golden Eagle passports	**3**	2	4	4	4
Sale of personal property	**17**	10	35	19	42
Cooperative research	**3,001**	1,265	1,187	1,702	1,003
Royalties from sale of Smokey Bear and Woodsy Owl products	**96**	74	186	70	54
Acquisition of lands to complete land exchanges	**1,573**	1,086	380	109	151
Subtotal	**15,334**	7,673	16,636	9,410	5,978

See footnotes at end of table.

Table 3—Statement of receipts—fiscal years 1982-86—Continued

Receipts	1986	1985	1984	1983	1982
			1,000 dollars		
Other income:					
Estimated collections by Dep. of Energy for power licenses on Public Domain National Forest land	439	543	618	411	1004 2/
Estimated collections by Dep. of the Interior for mineral leases on Public Domain National Forest land	77,286	81,878	84,850	77,600	68,600
Value of roads built by timber purchasers in lieu of cash	117,026	107,949	154,108	153,203	164,128
Subtotal	194,751	190,370	239,576	231,214	233,732
Total	1,320,541	1,132,738	1,158,569	966,307	730,200
Other net deposits:					
Monies advanced on active timber sales: 3/					
Bal. from previous year	192,180	213,853	264,534	143,580	231,450
Deposited current year	1,014,971	842,201	869,404	755,185	426,903
Trans. to other accounts	-987,279	-863,874	-920,085	-634,231	-514,773
Bal. on deposit	219,872	192,180	213,853	264,534	143,580
Amounts deposited pending disposition: 4/					
Bal. from previous year	18,553	328	15,292	12,483	12,372
Deposited current year	20,072	34,012	9,709	9,862	20,226
Trans. to other accounts	-29,229	-15,787	-24,673	-7,053	-20,115
Bal. on deposit	9,396	18,553	328	15,292	12,483
Subtotal	229,268	210,733	214,181	279,826	156,063
Total	1,549,809	1,343,471	1,398,145	1,246,133	886,263

1/ Includes $19 million adjusted windfall profit tax payment for 1980-84.
2/ Increase due to an additional billing made by Federal Energy Regulatory Commission.
3/ Timber sale deposits made by timber purchasers.
4/ Budget clearing account.

Table 4—Statement of receipts—fiscal year 1986

Receipts	National Forests	Oregon and California grant lands	National Grasslands & L.U. Areas 1/	Other	Total
			1,000 dollars		
Receipts from sale and use of forest resources:					
Timber and forest products	726,046	19,083	3		745,132
Grazing	7,484	2	1,131		8,617
Land Uses	3,462	45	566		4,073
Recreation	30,263		12		30,275
Power	753		12		765
Minerals	12,280		30,633		42,913
Subtotal	780,288	19,130	32,357		831,775
Receipts from deposits for expenditures on National Forests:					
Timber sale area betterment	156,092				156,092
Timber salvage sales	20,677				20,677
Brush disposal	52,936				52,936
Restoration of Forest Service lands and improvements	176				176
Cooperative work	43,423				43,423
Operation & maint. of quarters	5,352				5,352
Gifts, donations & bequests	25				25
Subtotal	278,681				278,681
Other receipts:					
Misc. (sale, rents, etc.)				10,644	10,644
Golden Eagle passports 2/					
Sale of personal property 2/				3	3
Cooperative research				17	17
Royalties from sale of Smokey Bear and Woodsy Owl products				3,001	3,001
Acquisition of lands to complete land exchanges				96	96
				1,573	1,573
Subtotal				15,334	15,334

See footnotes at end of table.

Table 4—Statement of receipts—fiscal year 1986—Continued

Receipts	National Forests	Oregon and California grant lands	National Grasslands & L.U. Areas 1/	Other	Total
			1,000 dollars		
Other income:					
Estimated collections by Dep. of Energy for power licenses on Public Domain National Forest land	439				439
Estimated collections by Dep. of the Interior for mineral leases on Public Domain National Forest land	77,286				77,286
Value of roads built by timber purchasers in lieu of cash	117,026				117,026
Subtotal	194,751				194,751
Total	1,253,720	19,130	32,357	15,334	1,320,541
Other net deposits:					
Monies advanced on active timber sales					
Bal. from previous year	192,180				192,180
Deposited current year	1,014,971				1,014,971
Trans. to other accounts	-987,279				-987,279
Bal. on deposit	219,872				
Amounts deposited pending disposition					
Bal. from previous year	18,553				18,553
Deposited current year	20,072				20,072
Trans. to other accounts	-29,229				-29,229
Bal. on deposit	9,396				9,396
Subtotal	229,268				229,268
Grand total	1,482,988	19,130	32,357	15,334	1,549,809

1/ Land Utilization Projects.
2/ These receipts are credited to the Department of the Interior.

Table 5—Statement of expenditures—fiscal year 1986

	Total	Work for other public agencies (reimbursables)
	1,000 dollars	
National Forest System:		
Protection and management	616,445	11,912
Fighting forest fires	115,350	3,727
Cooperative work for others	41,747	0
Cooperative law enforcement	6,904	696
Flood prevention and watershed protection	2,318	1
Restoration of forest lands and improvements	102	0
Reforestation and timber-stand improvement 1/	126,243	4,564
Timber sale betterment (K-V) 2/	115,770	0
Brush disposal	40,421	0
Timber salvage sales	19,256	0
Oregon-California grant lands	59	0
Range betterment	3,662	0
Construction of facilities	25,236	381
Acquisition of lands, Forest Service	817	0
Acquisition of lands, Land and Water Conservation Fund	40,815	0
Construction of forest roads and trails	186,635	2,432
Timber purchaser roads constructed by the Forest Service	5,881	0
Restoration of roads, Federal highway funds	15,323	0
Road and trail maintenance	73,657	1,090
Mount St. Helens emergency activities	-3	0
Tongass timber supply fund	46,011	0
General administration 3/	231,260	11,637
Operation & maintenance of quarters	4,768	0
Subtotal	1,718,677	36,440
Research:		
Tongass timber supply fund	1,982	0
Forest research	122,557	9,169
Construction of research facilities	824	0
Cooperative research	2,507	0
Energy security reserve, DOE	-3	0
Federal photovoltaics utilization program, DOE	0	0
Gifts, donations, and bequests for forest and rangeland research	4	12
Subtotal	127,871	9,181

See footnotes at end of table.

Table 5—Statement of expenditures—fiscal year 1986—Continued

	Total	Work for other public agencies (reimbursables)
	1,000 dollars	
State and Private Forestry:		
Cooperation and general forestry assistance	59,376	5,590
Resource conservation and development	674	0
Rural community fire protection grants	3,019	0
River basins	1,033	0
Flood prevention and watershed planning	2,029	0
Licensee programs (Smokey Bear and Woodsy Owl)	95	0
Forestry Incentives Program, Agriculture Conservation Program, and Pesticide Impact Assessment	365	0
Subtotal	66,591	5,590
Human Resource Programs:		
Job Corps	56,448	423
Senior Community Service Employment Program	21,782	21,782
Subtotal	78,230	22,205
Total	1,991,369	73,416
Internal equipment and supplies service:		
Working Capital Fund	86,898	86,898
Grand total	2,078,267	160,314

1/ Includes obligations of $30,059,000 for Reforestation Trust Fund.
2/ K-V = Knutson-Vandenberg Act.
3/ $18,860,921 in obligations and receivables were inadvertantly omitted in reporting upward to Treasury and OMB. The obligations and reimbursables should have been $250,120,876 and $30,498,375, respectively. The obligations and receivables have been recorded in FY 1987.

Table 6—Statement of expenditures—fiscal years 1982-86

	1986	1985	1984	1983	1982
			Million dollars		
National Forest System	**1,718.7**	1,849.5	1,737.4	1,715.0	1,600.1
Forest Research	**127.9**	123.0	117.0	114.1	118.6
State and Private Forestry	**66.6**	72.0	69.0	72.6	75.2
Human Resource Programs	**78.2**	73.8	76.4	72.4	88.5
Working Capital Fund	**86.9**	81.0	94.9	86.5	111.0
Total 1/	**2,078.3**	2,199.3	2,094.7	2,060.6	1,993.4

1/ Columns may not add due to rounding.

Table 7—Distribution of employees by program and occupational category—selected fiscal years

	1986	1985	1984 1/	1980	1975
Research:					
Clerical	**501**	526	468	627	460
Technical	**1,206**	1,082	942	968	528
Administrative	**246**	241	215	302	246
Professional	**1,240**	1,253	1,099	1,452	1,408
Subtotal	**3,193**	3,102	2,724	3,349	2,642
State and Private Forestry:					
Clerical	**46**	46	52	163	81
Technical	**46**	41	37	80	31
Administrative	**27**	26	23	42	28
Professional	**100**	110	109	347	256
Subtotal	**219**	223	221	632	396
National Forest System:					
Clerical	**4,351**	4,849	4,947	6,361	6,411
Technical	**23,726**	26,158	25,143	30,036	28,774
Administrative	**3,104**	3,073	2,519	2,370	1,860
Professional	**9,014**	9,533	9,750	9,082	7,562
Subtotal	**40,195**	43,613	42,359	47,849	44,607
Total	**43,607**	46,938	45,304	51,830	47,645
Full-time equivalents	**36,918**	38,524	40,134	49,005	30,123

1/ Figures revised based on updated data available after the 1984 Report of the Forest Service was published.

Table 8—Distribution of employees by tour of duty as reported in July of selected years

	1986	1985	1984 1/	1980	1975
Permanent full-time	**27,419**	29,211	30,030	21,421	19,568
Other permanent	**3,017**	3,713	3,965	15,815	12,115
Temporary	**14,121**	15,019	15,225	24,043	18,076
Total	**44,557**	47,943	49,220	61,279	49,759

1/ Figures revised based on updated data available after the 1984 Report of the Forest Service was published.

Table 9--Summary of Forest Service Human Resource Programs--fiscal year 1986

Program	Program funding	Value of work accomplished	Persons served	Percent		Person years accomplished	Percent placement	Return per dollar invested
				Women	Minority			
	Million dollars							Dollars
Youth Conservation Corps 1/	Unfunded	4.0	2,107	45	14	342	-- 2/	1.14
Job Corps 3/	56.4	19.6	9,042	9	52	3,790	80	--
Senior Community Service Employment Program 3/	21.8	33.0	6,155	35	21	2,829	15	1.51
Volunteers in the National Forests 4/	Unfunded	23.0	51,720	30	7	1,909	--	--
Hosted programs	Unfunded	9.7	6,394	19	36	775	--	--
Total	78.2	89.3	75,418	--	--	9,645	--	--

1/ Funds were not directly appropriated for Youth Conservation Corps; the Congress earmarked not less than $3.2 million to be expended from funds available to the Forest Service.
2/ -- = not applicable.
3/ Statistics are for the July 1, 1985, through June 30, 1986, program year.
4/ Statistics include the Touch America Project (TAP).

Table 10—Summary of National Forest System accomplishments compared to funded output levels and 5-year average—fiscal year 1986

Resource area	Activity	Units 1/	1986 Funded	1986 Accomplished	1986 Percent of funded	1982-86 average accomplishment	1986 as percent of 5-year average
Resource:							
Recreation	Visitor use	MM RVD's	226.5	226.5	100	228.1	99.3
Wilderness	Management	MM acres	32.1	32.1	100	27.9	114.9
Wildlife and fish	Habitat improvement 2/	M acres	125.2	122.8	98	291.2	42.2
Range	Permitted grazing use	MM AUM's	10.1	9.7	96	10.0	96.6
Timber	Sales offering	B board ft	11.1	11.7	105	11.4	102.8
	Silvicultural exams	MM acres	4.1	5.8	141.5	6.0	97.3
	Reforestation						
	Appropriated funds	M acres	138.7	148.9 3/	107	181.9	81.9
	K-V funds 4/	M acres	192.5	215.1	112	182.4	117.9
	Timber-stand improvement						
	Appropriated funds	M acres	188.4	259.4 3/	137.7	250.0	103.8
	K-V funds	M acres	130.9	100.7	77	122.2	82.4
Soil and water	Resource improvement 5/	M acres	6.3	8.1	129	5,976.3	0.1
Minerals	Leases and permits	Cases	24,439	26,635	109	27,995.4	95.1
Support:							
	Trail construction/ reconstruction	Miles	635.1	729.8	115	538.8	135.4
	Road construction						
	Appropriated funds	Miles	1,167.4	1,312.2 6/	112	1,724.3	76.1
	Purchaser credit 7/	Miles	5,900.0	5,165.4	88	6,265.0	82.4
	Fuel management 8/	M acres	297.2	321.0	108	288.3	111.4
	Land acquired						
	Purchase and donation	M acres	43.7	44.5	102	62.3	71.4
	Exchanges	M acres	85.1	133.3	157	134.0	99.5
	Landline location 9/	Miles	4,422	4,828	109	5,827.0	82.9

1/ M = thousand, MM = million, B = billion; RVD's = recreation visitor-days, AUM's = animal unit months.
2/ Average for 1982-86 includes 197,394 acres accomplished with Knutson-Vandenberg funds in 1984; 1981-85 average was 132,229 acres.
3/ Includes Tongass acres.
4/ K-V = Knutson-Vandenberg Act.
5/ Average for 1982-86 does not include 3,858 acres accomplished with K-V funds in 1985; 1982-85 average was 4,472 acres.
6/ Includes Tongass Timber Supply miles.
7/ Average for 1982-86 includes 257 miles turned back to Forest Service in 1986; 1982-86 average was 624 miles.
8/ Does not include 8,571 acres accomplished through human resource programs and 320,618 acres with brush disposal funds. The 1981-85 average was 8,315 acres accomplished through human resource programs and 431,156 acres using brush disposal funds.
9/ Does not include landline maintenance of previously established but deteriorating landlines.

Table 11—National Forest System funding—fiscal year 1986 compared to 1982-86 average

	1986		1982-86 average	Percent of actual to average
	Actual	RPA 1/		
	1,000 constant 1986 dollars 2/			
Minerals area management	**27,164**	27,123	25,662	105.9
Real estate management	**19,978**	19,949	21,425	93.2
Landline location	**27,399**	27,358	29,026	94.4
Maintenance of facilities	**14,124**	14,103	16,388	86.2
Forest fire protection	**151,669**	151,441	162,690	93.2
Fighting forest fires	**166,652**	951	69,757	238.9
Cooperative law enforcement	**6,659**	6,659	5,920	12.5
Forest road maintenance	**61,856**	61,856	70,913	87.2
Forest trail maintenance	**9,537**	9,537	11,483	83.1
Sales administration and management	**174,007**	173,745	187,748	92.7
Reforestation and stand improvement 3/	**95,433**	95,128	116,671	81.8
Recreation use	**99,017**	98,869	105,338	94.0
Wildlife and fish habitat management	**37,087**	37,031	37,503	98.9
Range management	**26,894**	26,854	29,239	92.0
Soil and water management	**30,524**	30,478	32,747	93.2
Subtotal	**948,000**	781,082	922,511	102.8
General administration (subtotal)	**251,229**	250,852	272,298	92.3
Youth Conservation Corps 4/	**(3,234)**	--	752	0
Construction and land acquisition:				
Construction of facilities 5/	**26,211**	25,735	30,929	84.7
Forest road construction	**180,935**	180,112	239,291	75.6
Forest trail construction	**6,866**	6,731	5,956	115.3
Forest roads purchaser construction 6/	**(91,474)**	(107,885)	0	0
Subtotal	**214,012**	212,578	276,176	77.5

See footnotes at end of table.

Table 11—National Forest System funding—fiscal year 1986 compared to 1982-86 average—Continued

	1986		1982-86 average	Percent of actual to average
	Actual	RPA 1/		
	1,000 constant 1985 dollars 2/			
Land acquisition	**31,356**	26,920	45,188	69.4
Acquisition of lands for National Forests, special acts	**744**	744	657	0
Acquisition of lands to complete land exchange	**1,086**	20	366	297.0
Appropriated trust fund	**12**	85	68	17.6
Range betterment 7/	**3,635**	3,635	5,106	71.2
Permanent appropriations	**651,533**	364,354	442,411	147.3
Trust funds	**202,517**	149,898	201,269	100.6
Subtotal	**890,883**	545,656		
Total	**2,304,124**	1,790,168	2,173,662	107.6

1/ Information from 1985-2030 Resources Planning Act-Program. The FY 1986 Gramm-Rudman-Hollings program level was used as the starting point for the RPA Program.
2/ Survey of Current Business (BEA) index values used for 1982-85. BEA updates gross national product implicit price deflators periodically. These are current as of June 1986.
3/ Includes reforestation trust fund dollars.
4/ Funds were provided for unique circumstances and are not included in comparison.
5/ Excludes construction of research facilities, which is included in table 61.
6/ This account was taken off budget in 1982. For comparison, the amounts are shown as non-add items.
7/ Range betterment for actual and RPA equals 50 percent of actual grazing receipts.

Table 12—National Forest System funding—fiscal years 1982-86

	1986	1985	1984	1983	1982
			1,000 dollars		
Minerals area management	**27,164**	26,572	25,670	22,598	18,691
Land management	**19,978**	20,836	18,709	19,935	20,636
Landline location	**27,399**	29,090	29,448	25,034	25,011
Maintenance of facilities	**14,124**	14,792	14,070	21,710	11,833
Forest fire protection	**151,669**	156,591	156,734	153,889	142,235
Fighting forest fires	**166,652**	62,227	35,301	1,000 1/	69,004
Cooperative law enforcement	**6,659**	7,212	5,175	5,174	3,734
Forest road maintenance	**61,856**	65,406	64,650	73,666	65,286
Forest trail maintenance	**9,537**	9,256	9,267	13,988	11,312
Sales administration and management	**174,007**	194,702	187,547	162,125	161,244 2/
Reforestation and stand improvement 3/	**95,433**	104,664	85,582	161,963	95,611
Recreation use	**99,017**	102,057	100,919	99,774	91,180
Wildlife and fish habitat management	**37,087**	36,726	35,360	33,349	33,136
Range management	**26,894**	28,170	27,267	27,031	27,287
Soil and water management	**30,524**	31,808	29,956	28,713	32,015
Subtotal	**948,000**	890,109	825,655	849,949	808,214
General administration (subtotal)	**251,229**	258,844	259,865	260,915	242,290
Youth Conservation Corps 4/	**(3,234)**	(3,234)	(3,500)	3,400	(1,600)
Construction					
Construction of facilities 5/	**26,211**	26,228	23,445	51,007	17,465
Forest road construction	**180,935**	228,914	222,675	245,169	236,204
Forest trail construction	**6,866**	7,093	5,182	4,936	4,038
Forest roads purchaser construction 6/	**(91,474)**	(192,301)	(240,000)	(240,000)	(242,542)
Chugach Natives, Inc. 7/	**(0)**	(0)	(0)	(9,000)	(3,000)
Subtotal	**214,012**	262,235	251,302	301,112	257,707

See footnotes at end of table.

Table 12—National Forest System funding—fiscal years 1982-86—Continued

	1986	1985	1984	1983	1982
			1,000 dollars		
Land acquisition	31,356	50,535	40,075	63,077 8/	26,262
Acquisition of lands for Winema NF	0	0	281	0	0
Acquisition of lands for National Forests, special acts	744	766	780	753	724
Acquisition of lands to complete land exchange	1,086	42	380	109	151
Appropriated trust fund	12	35	90	90	84
Range betterment	3,635	3,966	4,028	5,378	6,583
Permanent appropriations	651,533	393,634	382,154	296,819	365,454
Trust funds	202,517	172,541	231,103	169,937	111,904
Total	2,304,124	2,094,791	1,995,713	1,951,539	1,819,373

1/ The Forest Service did not receive a supplemental fire appropriation in 1983. Under a new procedure, actual expenses will be reimbursed the following year.
2/ Does not include $1,407,000 reprogrammed from Helistat to gypsy moth.
3/ Includes reforestation trust fund dollars.
4/ Funds provided for unique circumstances and are not included in comparison.
1981 account transferred to USDI. Forest Service operated a $4.9 million transfer program. 1982 - operated a $1.6 million program from available funds. 1983 - $10 million appropriated. Forest Service portion $3.4 million. 1984 - operated a $3.5 million program from available funds. 1985 - operated a $3.2 million program from available funds. 1986 - operated a 3.5 million program from available funds.
5/ Excludes construction of research facilities, which is included in table 63.
6/ This account was taken off budget in 1982. For comparison, the amounts are shown as non-add items.
7/ Excludes Chugach Natives appropriations, which were for unique circumstances.
8/ Includes $6.2 million transferred from National Park Service.

Table 13—Summary of National Forest System accomplishments compared to RPA projections—fiscal year 1986

Resource area	Activity	Units 1/	1986 Accomplished	1986 Percent of RPA accomplished	1986 RPA recommended level
Final output 2/					
Timber	Sales offering	B board ft	11.7	103	11.4
Recreation	Visitor use	MM RVD's	226.5	105	215
Range	Permitted grazing use	MM AUM's	10.1	103	9.8
Minerals	Applications, proposals, and administration	Cases 3/	26,635	111	24,000
Intermediate output 4/					
Timber	Reforestation	M acres	364	105	346
	Timber-stand improvement	M acres	360	108	334
Wildlife	Habitat improvement	M acres	355	131	272
Wilderness	Management	MM acres			32
Soil and water	Resource improvement	M acres	12.7	192	6.6
Trails	Construction/ reconstruction	Miles	1,092	145	755
Roads	Construction/ reconstruction	Miles	6,417	83	7,762 5/
Fire	Fuel management 6/	M acres	650	103	634
Lands	Purchase and donation	M acres	44.5	80	55.6 7/

1/ M = thousand, MM = million, B = billion; RVD's = recreation visitor-days, AUM's = animal unit months.
2/ Final output = forest and rangeland goods and services purchased or consumed by the private sector or individual consumers.
3/ Reported as operating plans in the 1985-2030 Resources Planning Act-Program.
4/ Intermediate output = work performed by the Forest Service that contributes to the production of final outputs.
5/ Represents a projection of miles constructed/reconstructed for all roads and is contingent on planned resource outputs.
6/ Does not include acres accomplished through human resource programs.
7/ RPA numbers exclude donations, which are not tracked in RPA Program.

Table 14—Draft and final forest plan environmental impact statements filed with the Environmental Protection Agency by Region as of September 30, 1986 1/

Northern Region	Rocky Mountain Region	Southwestern Region	Intermountain Region
Draft	Final	Draft	Draft
Nezperce(ID)	Rio Grande(CO)	*Apache-Sitgreaves(AZ)	Salmon(ID)
Gallatin(MT)	Nebraska(NE)	*Coconino(AZ)	Challis(ID)
Idaho Panhandle(ID)	Bighorn(WY)	*Santa Fe(NM)	Ashley(UT)
Clearwater(ID)	Arapaho-Roosevelt(CO)	*Kaibab(AZ)	Sawtooth(ID)
Kootenai(MT)	Grand Mesa, Uncompagre, and Gunnison(CO)	Final	Manti-LaSal(UT)
Final	Routt(CO)	Cibola(NM)	**Bridger-Teton(WY)
*Flathead(MT)	San Juan(CO)	Tonto(AZ)	**Boise(ID)
*Lewis & Clark(MT)	Black Hills(SD)	*Carson(NM)	Final
*Beaverhead(MT)	White River(CO)	*Coronado(AZ)	Uinta(UT)
*Helena(MT)	Pike-San Isabel(CO)	*Gila(NM)	Wasatch-Cache(UT)
*Lolo(MT)	*Medicine Bow(WY)	*Lincoln(NM)	Targhee(ID)
**Bitteroot(MT)	*Shoshone(WY)	*Prescott(AZ)	*Caribou(ID)
**Custer(MT)	**Alaska Region**		*Fishlake(UT)
**Deerlodge(MT)	Final		*Toiyabe(NV)
	Chugach(AL)		*Dixie(UT)
			*Humboldt(NV)
			*Payette(ID)

Pacific Southwest Region	Pacific Northwest Region	Southern Region	Eastern Region
Draft	Draft	Draft	Draft
Angeles(CA)	*Deschutes(OR)	Nantahala-Pisgah(NC)	Green Mountain(VT)
Tahoe(CA)	*Okanogan(WA)	Texas(TX)	Shawnee(IL)
Plumas(CA)	*Wallowa-Whitman(OR)	Final	*Wayne(OH)
Stanislaus(CA)	*Wenatchee(WA)	Francis Marion(SC)	Final
Lake Tahoe Basin Management Unit(CA)	**Siskiyou(OR)	Sumter(SC)	Hoosier(IN)
Sequoia(CA)	**Ochoco(WA)	Mississippi(MS)	*Nicolet(WI)
San Bernardino(CA)	**Olympic(WA)	Kisatchie(LA)	*Superior(MN)
Lassen(CA)	**Siuslaw(OR)	Chattahoochee-Oconee(GA)	*Monongahela(WV)
Los Padres(CA)	**Umatilla(OR)	Daniel Boone(KY)	*Chippewa(MN)
Shasta-Trinity(CA)	**Gifford Pinchot(WA)	Jefferson(VA)	*Allegheny(PA)
*Mendocino(CA)	**Mt. Hood(OR)	*George Washington(VA)	*Huron-Manistee(MI)
**Sierra(CA)	**Umpqua(OR)	*Caribbean(PR)	*Chequamegon(WI)
**Eldorado(CA)	**Fremont(OR)	*Cherokee(TN)	*Mark Twain(MO)
**Klamath(CA)	**Malheur(OR)	*Ozark-St. Francis(AR)	*Hiawatha(MI)
**Modoc(CA)	**Rogue River(OR)	*Florida(FL)	*Ottawa(MI)
**Six Rivers(CA)	**Colville(WA)	*Ouachita(AR)	*White Mountain(NH)
Final	**Mt. Baker(WA)	*Alabama(AL)	
*Cleveland		*Croatan-Uwharrie(NC)	

1/ Includes Forest plans filed in previous years.
* Plans filed in 1986.
** Plans completed but not filed by 9/30/86.

Table 15—Planned and approved minerals cases by Region—fiscal year 1986

Region	Cases		
	RPA recommended level 1/	Planned	Accomplished
Northern	5,563	5,345	4,782
Rocky Mountain	3,175	3,944	3,884
Southwestern	1,627	1,459	1,943
Intermountain	3,644	3,751	3,191
Pacific Southwest	2,376	1,857	2,119
Pacific Northwest	3,346	3,050	3,633
Southern	1,934	2,369	2,880
Eastern	1,844	1,818	3,334
Alaska	491	846	869
Total	**24,000**	**24,439** 2/	**26,635** 3/

1/ Information from 1985-2030 Resources Planning Act-Program.
2/ The planned cases reflect the 4.3 percent budget reduction in relation to the Deficit Control Act.
3/ Some of the increase in the minerals management work was the result of leases being turned back and reoffered due to the changed oil market. Activities related to gold and platinum-group metals continued to increase in FY 1986.

Table 16—Energy mineral workload and production—fiscal years 1982-86

Fiscal year	Acres under lease	Energy-related cases	Energy-related cases in inventory	Oil production	Gas production	Coal production
	Millions			Barrels	1,000 cubic feet	Short tons
1982	25.0	16,380	7,200	13,000,000	214,000,000	13,000,000
1983	34.4	15,940	4,400	13,000,000	205,000,000	14,300,000
1984	34.0	13,103	2,805	12,000,000	205,000,000	15,100,000
1985	33.3	15,473	3,533	13,000,000	217,000,000	15,600,000
1986 1/	**28.2**	**14,194**	**2,363**	**13,000,000**	**180,000,000**	**21,000,000**

1/ All figures are estimated.

Table 17—Land acquisition and exchange—fiscal year 1986

	Acres	Cases	Value
			Million dollars
Purchase	43,165	1,471 1/	41.20
Exchange	133,300	183	102.40
Donation	1,383	12	0.37
Total	**177,848**	**1,666**	**143.97**

1/ Includes 1,367 cases in the Lake Tahoe Basin, CA and NV.

Table 18—Miles of landline location by Region—fiscal year 1986

Region	Total miles boundary	1986 mileage accomplishment	Total miles surveyed
Northern	30,664	571	5,384
Rocky Mountain	51,433	324	3,559
Southwestern	19,991	195	5,344
Intermountain	28,659	369	3,712
Pacific Southwest	29,577	884	8,892
Pacific Northwest	25,627	1,011	11,657
Southern	42,280	657	34,085
Eastern	42,642	774	6,726
Alaska 1/	1,536	40	812
Total	**272,409**	**4,825**	**80,171**

1/ Does not reflect changes due to Alaska Native Claims Settlement Act of 1971 (85 Stat. 688), as amended, and the Alaska Statehood Act of 1958 (72 Stat. 339), as amended. As the land selections are overlapping and/or in a constant state of change, the Region is not keeping track of the boundary changes at this time.

Table 19—Lands administered by the Forest Service as of September 30, 1986

State, Commonwealth, or Territory 1/	National Forests, purchase units, research areas, and other areas	National Grasslands	Land Utilization Projects	Total
		Acres		
Alabama	647,085	0	40	**647,125**
Alaska	22,811,098	0	0	**22,811,098**
Arizona	11,274,109	0	0	**11,274,109**
Arkansas	2,483,131	0	0	**2,483,131**
California	20,483,889	0	19,222	**20,503,111**
Colorado	13,833,178	611,930	440	**14,445,548**
Connecticut	24	0	0	**24**
Florida	1,099,721	0	0	**1,099,721**
Georgia	857,553	0	9,340	**866,893**
Hawaii	1	0	0	**1**
Idaho	20,396,478	47,746	0	**20,444,224**
Illinois	263,363	0	0	**263,363**
Indiana	187,707	0	26	**187,733**
Kansas	0	108,177	0	**108,177**
Kentucky	680,775	0	0	**680,775**
Louisiana	600,102	0	0	**600,102**
Maine	50,977	0	260	**51,237**
Michigan	2,764,714	0	959	**2,765,673**
Minnesota	2,805,482	0	0	**2,805,482**
Mississippi	1,147,234	0	0	**1,147,234**
Missouri	1,458,058	0	13,104	**1,471,162**
Montana	16,798,058	0	0	**16,798,058**
Nebraska	257,514	94,332	0	**351,846**
Nevada	5,161,692	0	0	**5,161,692**
New Hampshire	705,798	0	0	**705,798**
New Mexico	9,189,265	136,412	240	**9,325,917**
New York	13,232	0	0	**13,232**
North Carolina	1,218,580	0	0	**1,218,580**
North Dakota	796	1,104,968	0	**1,105,764**
Ohio	178,554	0	0	**178,554**
Oklahoma	249,205	46,300	0	**295,505**
Oregon	15,501,867	111,379	856	**15,614,102**
Pennsylvania	510,691	0	0	**510,691**
Puerto Rico	27,846	0	0	**27,846**
South Carolina	611,196	0	0	**611,196**
South Dakota	1,134,204	862,809	0	**1,997,013**
Tennessee	625,760	0	0	**625,760**
Texas	634,242	117,542	0	**751,784**
Utah	8,043,191	0	0	**8,043,191**
Vermont	325,176	0	0	**325,176**
Virgin Islands	147	0	0	**147**
Virginia	1,637,457	0	0	**1,637,457**
Washington	9,136,513	0	738	**9,137,251**
West Virginia	978,347	0	0	**978,347**
Wisconsin	1,506,587	0	0	**1,506,587**
Wyoming	8,682,599	572,163	0	**9,254,762**
Total	186,973,196	3,813,758	45,225	**190,832,179**

1/ States not listed have no lands administered by the Forest Service.

Table 20—Fuels treatment acreage accomplished by appropriation—fiscal year 1986

Region	RPA recommended level	Accomplishment			Total
		Forest fire protection	Volunteer and contributed work	Brush disposal funds	
			Acres		
Northern	30,113	7,173	313	36,004	43,490
Rocky Mountain	14,283	6,970	123	9,097	16,190
Southwestern	75,209	31,437	0	50,286	81,723
Intermountain	62,073	29	50	27,024	27,103
Pacific Southwest	48,553	13,290	7,882	41,333	62,505
Pacific Northwest	183,561	29,146	108	154,848	184,102
Southern	213,600	229,989	0	0	229,989
Eastern	6,326	2,951	95	1,866	4,912
Alaska	37	0	0	160	160
Total	633,755	320,985	8,571	320,618	650,174

Table 21—Timber offered, sold, and harvested—fiscal years 1982-86

	1986 1/	1985	1984	1983	1982
Offered: 2/					
Volume (billion board feet)	**11.7**	11.5	11.9	11.3	11.1
Sold:					
Number of sales	**349,977**	366,874	342,964	235,585	143,723
Volume (billion board feet)	**11.0**	10.8	10.7	11.1	10.0
Value (million dollars) 3/	**757.0**	558.2	698.7	774.4	614.2
Harvested:					
Volume	**11.8**	10.9	10.5	9.2	6.7
Value (million dollars) 4/	**786.9**	720.6	759.6	649.6	339.7

1/ Preliminary.
2/ This is the number of sales that can be converted to board feet. Not included are 205,132 sales of nonconvertible product in FY 1986.
3/ This is the high bid value from all sales sold and includes stumpage, cost of reforestation, stand improvement, and timber salvage. Does not include value of roads or brush disposal.
4/ This is the current stumpage rate for the actual volume harvested and includes the reforestation and stand improvement costs and timber salvage. Does not include value of roads or brush disposal.

Table 22—Timber offered, sold, and harvested by Region—fiscal years 1984-86

	1986			1985			1984		
	Offered 1/	Sold 2/	Harvested 3/	Offered 1/	Sold 2/	Harvested 3/	Offered 1/	Sold 2/	Harvested 3/
	Million board feet								
Northern	1,044.0	914.9	1,024.0	1,043.6	937.9	944.4	1,102.5	917.1	968.5
Rocky Mountain	403.3	314.1	411.5	488.0	490.3	392.7	495.4	414.0	339.5
Southwestern 4/	440.6	446.9	485.5	438.7	342.8	394.5	510.8	363.4	387.3
Intermountain 4/	431.6	483.7	461.5	432.2	379.7	433.6	457.9	396.1	380.1
Pacific Southwest	1,495.0	1,508.4	1,854.1	1,628.6	1,679.9	1,664.3	1,734.8	1,457.7	1,657.5
Pacific Northwest	5,366.5	5,059.9	4,965.2	4,679.2	4,752.5	4,760.3	4,925.7	4,962.1	4,538.9
Southern	1,366.6	1,295.9	1,560.7	1,551.8	1,412.2	1,382.0	1,423.5	1,324.9	1,275.4
Eastern 4/	735.8	753.1	732.6	840.8	782.0	737.5	810.4	774.1	740.0
Alaska 4/	384.4	189.7	291.4	433.5	41.7	232.0	477.5	52.3	261.5
TOTAL	11,667.8	10,966.6	11,786.5	11,536.4	10,819.0	10,941.3	11,938.5	10,661.7	10,548.7

1/ Sales volume offered for the first time.
2/ Does not include the volume of long-term sales released for harvesting. Includes miscellaneous small sales that were previously offered and/or sold and were reoffered and sold in the fiscal year being displayed.
3/ Includes the volume harvested on long-term sales.
4/ Includes long-term sales volume prepared in the offered column.

Table 23—Number of sales, volume, and value of timber sold on National Forest lands by size class—fiscal years 1982-86

	Sale size class							
	To $300	$301-$2,000	$2,001-2,000MBF 1/	2,001-5,000MBF	5,001-15,000MBF	15,001MBF and over	Nonconvertibles 2/	Total less nonconvertibles 3/
1982								
Number of Sales	131,498	8,805	2,223	605	500	92	216.9	143,723
Volume (MBF)	441,078	415,776	1,358,642	1,881,008	4,266,677	1,666,455	0	10,029,636
Value ($1,000)	3,580.3	8,365.4	82,587.9	139,849.1	292,693.0	87,112.2	1,755.2	614,187.9
1983								
Number of Sales	226,181	5,684	2,499	574	563	84	214,429	235,585
Volume (MBF)	769,628	455,864	1,483,998	1,896,965	4,888,337	1,566,605	0	11,061,397
Value ($1,000)	5,081.3	9,116.0	97,819.5	132,413.9	421,334.7	108,605.1	1,715.7	774,370.5
1984								
Number of Sales	330,252	8,693	2,834	619	555	53	206,869	343,006
Volume (MBF)	903,189	379,271	1,634,609	2,085,355	4,711,844	947,429	0	10,661,698
Value ($1,000)	5,599.1	7,262.7	103,076.2	149,605.1	372,807.1	60,368.0	1,581.7	698,718.2
1985								
Number of Sales	348,999	13,563	3,113	562	595	42	225,493	366,874
Volume (MBF)	830,237	589,475	1,698,402	1,868,425	5,063,888	768,564	0	10,818,991
Value ($1,000)	5,810.1	8,562.2	80,568.9	100,221.6	314,475.0	48,547.3	1,662.7	558,192.1
1986								
Number of Sales	**325,646**	**20,320**	**2,763**	**587**	**606**	**55**	**205,132**	**349,977**
Volume (MBF)	**851,974**	**363,324**	**1,517,092**	**1,922,224**	**5,269,466**	**1,042,497**	**0**	**10,966,577**
Value ($1,000)	**7,359.1**	**8,533.7**	**76,133.3**	**116,679.4**	**466,693.2**	**81,624.3**	**1,671.4**	**757,023**

1/ MBF = thousand board feet
2/ Non-convertible products include Christmas trees, cones, burls, etc.
3/ May not add due to rounding.

Table 24—Timber sold and harvested, by State—fiscal year 1986

State or Commonwealth 2/	Timber sold			Timber harvested 3/	
	Sales	Volume MBF 5/	Value 4/ actual dollars	Volume MBF 5/	Value 4/ actual dollars
Alabama	517	79,637	4,916,286	109,420	7,208,959
Alaska	87	189,707	1,527,934	291,374	516,377
Arizona	28,087	278,714	9,093,897	317,433	19,136,739
Arkansas	3,480	218,546	12,078,112	250,085	16,843,718
California	64,951	1,523,424	112,604,104	1,862,079	152,952,908
Colorado	37,710	196,489	1,858,795	192,558	1,767,267
Florida	142	90,541	5,397,583	129,724	7,962,725
Georgia	401	66,094	3,140,092	66,636	3,648,499
Idaho	32,024	735,672	21,252,007	772,255	26,035,389
Illinois	84	11,143	471,510	9,962	203,815
Indiana	119	495	4,351	9,340	483,849
Kentucky	947	33,313	734,408	42,697	858,844
Louisiana	2,755	165,336	4,198,105	230,772	9,515,405
Maine	3	751	53,741	3,093	103,854
Michigan	1,146	192,222	3,348,382	184,650	3,325,880
Minnesota	372	156,012	1,451,661	159,979	2,053,294
Mississippi	1,213	211,862	15,430,927	250,007	23,014,975
Missouri	3,294	73,508	2,212,980	77,538	2,719,789
Montana	18,185	509,261	11,674,822	560,244	20,751,971
Nebraska	264	1,422	13,215	2,666	3,090
Nevada	2,299	2,005	31,296	3,440	48,712
New Hampshire	101	28,783	680,081	26,649	624,934
New Mexico	22,592	168,116	2,701,370	168,064	3,152,235
New York	47	402	28,762	508	34,554
North Carolina	506	60,373	1,222,840	71,088	1,589,513
North Dakota	127	91	1,520	90	1,520
Ohio	253	11,104	386,118	7,375	279,349
Oklahoma	162	39,615	1,558,587	39,884	2,561,077
Oregon	60,852	3,762,948	410,104,397	3,704,467	365,741,685
Pennsylvania	147	77,388	5,137,232	84,807	8,704,434
South Carolina	422	102,260	7,437,518	97,659	8,318,631
South Dakota	157	63,817	2,774,806	115,131	2,668,182
Tennessee	253	35,849	1,237,531	36,279	1,174,396
Texas	1,139	128,006	6,101,169	173,698	12,476,147
Utah	20,221	101,286	1,062,427	104,476	1,041,969
Vermont	354	10,691	210,401	10,483	312,214
Virginia	960	53,088	833,839	60,946	805,880
Washington	32,253	1,291,818	98,423,158	1,264,274	73,188,390
West Virginia	469	49,093	1,315,287	26,039	693,198
Wisconsin	180	152,891	2,130,092	134,002	2,236,715
Wyoming	10,702	92,804	2,181,640	134,619	2,120,140
Total 6/	**349,977**	**10,966,577**	**757,022,983**	**11,786,490**	**786,881,222**

1/ Excludes nonconvertible products such as Christmas trees, cones, burls, etc.
2/ States not listed had no timber sold or harvested in fiscal year 1986.
3/ Preliminary.
4/ Includes Knutson-Vandenberg and salvage sale receipts. Does not include brush disposal and road costs.
5/ MBF = thousand board feet.
6/ Columns may not add due to rounding.

Table 25—Values, costs, and associated outputs for the fiscal year 1986 timber-sale program

Timber-Sale Program Information Reporting System

In October 1984, Congress directed the Forest Service to develop an expanded timber cost-accounting system to better identify the costs of the timber-sale program by component, and allow for a comparison of actual costs and benefits. The system was to also allow for identifying other aspects of the timber program, such as firewood and nonconvertible products. An interdisciplinary task force was organized to lead the effort. After 18 months of investigation, formulation of alternatives, testing on 35 Forests, and evaluation, a draft task force report was submitted to Congress in early 1986. The report provides details on the proposed timber-sale program information reporting system. A final report will be submitted during fiscal year 1987.

In response to a separate request by the House Appropriations Subcommittee on Interior and Related Agencies, the General Accounting Office (GAO) is proceeding to independently establish the baseline costs and accounting procedures they believe Congress and the Forest Service should have for the timber-sale program. While the timber program information system is being test implemented on at least one Forest in every Region in fiscal year 1987, the Subcommittee requested that full implementation be deferred until GAO completes their work and reports to the Subcommittee in the spring of 1987.

Unless GAO's recommendations in early 1987 lead to different direction from Congress, the Forest Service intends to phase in full implementation of the timber program information system over the coming years. As this information is compiled on an annual basis, it will enable the Agency to consistently portray, in a new Table 25, the costs and benefits of the national timber-sale program.

Table 26—Uncut timber volume under contract by Region—fiscal years 1982-86

Region	1986	1985	1984	1983	1982
			Million board feet 1/		
Northern	**3,274**	3,812	3,986	3,845	3,634
Rocky Mountain	**1,208**	1,361	1,227	1,130	1,157
Southwestern	**1,088**	1,228	1,125	1,320	1,150
Intermountain	**848**	896	1,004	949	890
Pacific Southwest	**4,456**	7,261	6,975	7,278	6,563
Pacific Northwest	**10,308**	18,263	18,336	18,695	18,125
Southern	**2,186**	2,785	2,870	2,296	2,296
Eastern	**2,054**	2,034	1,909	1,802	1,917
Alaska	**562**	509	460	456	365
Total	**25,984** 2/	38,149	37,892	37,771	36,097

1/ Volume in local scale. Long-term sales not included. Long-term sales volume under contract at the end of fiscal year 1984 was 6,671 million board feet and 7,112 million board feet in 1985.
2/ This volume under contract has been reduced by 9,748 million board feet as a result of the Federal Timber Contract Payment Modification Act of 1984.

Table 27—Timber funding—fiscal years 1984-86

	1986	1985	1984
		1,000 dollars	
National Forest System			
Timber management	**120,931**	140,432	141,912
Harvest administration	**53,076**	54,270	45,635
Subtotal	**174,007**	194,702	187,547
Support to timber sales program			
Mineral	**1,126**	1,195	939
Forest Fire Protection	**3,396**	4,989	4,051
Recreation	**7,698**	7,237	8,346
Wildlife and Fish	**8,381**	8,187	8,410
Range	**933**	800	889
Soil and Water	**7,531**	8,845	8,523
Subtotal	**29,065**	31,253	31,158
Road construction			
Forest Service construction	**151,577**	200,915	210,620
Purchaser construction	**(91,474)**	(107,887)	(111,057)
Purchaser construction by the Forest Service	**6,218**	9,103	10,673
Subtotal	**157,795**	210,018	221,293
Total, appropriated accounts	**360,867**	435,973	439,998
Special accounts 1/			
Timber salvage sales	**20,677**	16,055	12,775
Tongass timber supply fund	**45,793**	47,138	41,083
Subtotal	**66,470**	63,193	53,858
Total 2/	**427,337**	499,166	493,856

1/ Includes General Administration expenses.
2/ Includes Oregon and California (O&C) Grant Land Funding.

Table 28—Reforestation funding and accomplishments by funding source—fiscal years 1982-86

	Appropriated	Knutson-Vandenberg	Total
1982			
Million dollars 1/	67.4	72.5	139.9
1,000 acres	221.6	161.2	382.8
Constant dollars/acre	304.2	449.8	365.5
1983			
Million dollars 1/	82.0 2/	73.3	155.3
1,000 acres	193.2 2/	168.5	361.7
Constant dollars/acre	424.4	435.0	429.4
1984			
Million dollars 1/	47.2	73.3	120.5
1,000 acres	180.7 3/	195.3	376.0
Constant dollars/acre	261.4	375.3	320.6
1985			
Million dollars 1/	59.0	72.7	131.7
1,000 acres	175.2	194.6	369.8
Constant dollars/acre	336.5	373.7	356.1
1986			
Million dollars 1/	**51.6**	**67.1**	**118.7**
1,000 acres	**148.9**	**215.1**	**364.0**
Constant dollars/acre	**346.3**	**312.0**	**326.1**

1/ All dollars are constant 1986. No general administration funds included. Does not include funds for nursery and tree improvement.
2/ Does not include 65,500 acres of site preparation for planting in fiscal year 1984, as well as 14,500 acres of site preparation for natural regeneration accomplished with $15 million of Federal Emergency Jobs Program funds, P.L. 98-8.
3/ Increased accomplishments and reduced costs were due to the 65,500 acres of advanced site preparation work as a result of the Federal Emergency Jobs Program in fiscal year 1983.

Table 29—Reforestation program needs—fiscal years 1986-88

	Backlog	Current or anticipated	Total	Annual program appropriated funds 1/	
	1,000 acres			1,000 acres	Million dollars
10/1/85 balance	**47 2/**	**780**	**827**		
Fiscal year 1986:					
New Needs 3/	**0**	**+428**	**+428**		
Adjustments 4/	**-47 2/**	**+4 2/**	**-43 2/**		
Accomplishments	**0**	**-364**	**-364**	**148.9**	**51.6**
10/1/86 balance	0	848	848		
Fiscal year 1987:					
New needs 3/	0	+425	+425		
Projected accomplishments	0	-395	-395	139.7	47.5
10/1/87 balance	0	878	878		
Fiscal year 1988:					
New needs 3/	0	+425	+425		
Projected accomplishments	0	-363	-363	85.0	30.3
10/1/88 balance	0	940	940		

1/ Includes Reforestation Trust Fund pursuant to P.L. 96-451, as amended.
2/ These 47,000 acres have not yet gone through the Forest planning process, but are currently not feasible to plant or are within designated wilderness study areas. They have been included in current needs and will be treated, when feasible technology, access, or proper seed supplies become available, or removed from the reforestation needs as land use decisions are finalized.
3/ New needs are the results of timber harvests, regeneration failures, and natural disasters such as fires, storms, insects, and diseases.
4/ The adjustments include acres regenerated through natural stocking and changes by management decision (land classification, multiple use, wilderness designation, and land use decisions).

Table 30—Reforestation needs as of October 1, 1986, by State, Forest, and site productivity class

State, Commonwealth, or Territory 1/ National Forest	Acres by site productivity class 2/ 20-49	50-84	85-119	120+	Total acres
Alabama					
Alabama	**0**	**1,958**	**4,568**	**725**	**7,251**
Alaska					
Chugach	65	72	0	0	**137**
Tongass-Chatham	0	2,839	0	1,102	**3,941**
Tongass-Ketchikan	0	0	0	11,530	**11,530**
Tongass-Stikine	0	0	107	3,281	**3,388**
Subtotal	**65**	**2,911**	**107**	**15,913**	**18,996**
Arizona					
Apache-Sitgreaves	0	302	0	0	**302**
Coconino	45	3,385	80	0	**3,510**
Kaibab	402	1,165	0	0	**1,567**
Tonto	16	435	0	0	**451**
Subtotal	**463**	**5,287**	**80**	**0**	**5,830**
Arkansas					
Ouachita	122	24,192	3,589	0	**27,903**
Ozark and St. Francis	0	4,670	1,164	0	**5,834**
Subtotal	**122**	**28,862**	**4,753**	**0**	**33,737**
California					
Angeles	0	409	0	0	**409**
Cleveland	354	0	0	0	**354**
Eldorado	0	544	4,200	0	**4,744**
Inyo	28	786	0	0	**814**
Klamath	2,628	7,784	9,473	3,698	**23,583**
Lassen	0	1,582	1,901	1,202	**4,685**
Los Padres	50	350	19	0	**419**
Mendocino	442	2,036	1,849	106	**4,433**
Modoc	0	1,913	1,511	159	**3,583**
Plumas	14	3,735	1,371	1,096	**6,216**
Rogue River	0	0	352	0	**352**
San Bernardino	61	275	50	0	**386**
Sequoia	245	3,859	2,590	751	**7,445**
Shasta-Trinity	65	5,100	8,065	6,247	**19,477**

See footnotes at end of table.

Table 30—Reforestation needs as of October 1, 1986, by State, Forest, and site productivity class—Continued

State, Commonwealth, or Territory 1/ National Forest	Acres by site productivity class 2/ 20-49	50-84	85-119	120+	Total acres
Sierra	958	1,975	2,711	1,541	7,185
Siskiyou	0	0	169	0	169
Six Rivers	0	104	2,522	2,103	4,729
Stanislaus	0	306	4,167	3,334	7,807
Tahoe	11	3,053	3,007	8,190	14,261
Toiyabe	258	1,099	76	0	1,433
Subtotal	5,114	34,910	44,033	28,427	112,484
Colorado					
Arapaho and Roosevelt	908	448	0	0	1,356
Grand Mesa, Uncompahgre, and Gunnison	817	1,214	304	0	2,335
Pike and San Isabel	5,579	1,365	0	0	6,944
Routt	59	297	38	0	394
San Juan	4,856	9,335	0	0	14,191
White River	37	497	37	0	571
Subtotal	12,256	13,156	379	0	25,791
Florida					
Florida	16,220	11,475	4,015	367	32,077
Georgia					
Chattahoochee and Oconee	0	2,256	4,303	853	7,412
Idaho					
Boise	910	4,048	1,469	1,625	8,052
Caribou	0	389	49	0	438
Challis	330	357	0	0	687
Clearwater	5,953	129	2,054	8,579	16,715
Idaho Panhandle	11,065	1,015	7,310	6,138	25,528
Kootenai	0	0	358	40	398
Lolo	12	21	0	0	33
Nezperce	6,636	1,238	2,703	2,457	13,034
Payette	544	3,262	1,630	0	5,436
Salmon	3,299	1,550	0	0	4,849
Sawtooth	400	443	0	0	843
Targhee	0	4,634	0	0	4,634
Subtotal	29,149	17,086	15,573	18,839	80,647

See footnotes at end of table.

Table 30—Reforestation needs as of October 1, 1986, by State, Forest, and site productivity class—Continued

State, Commonwealth, or Territory 1/ National Forest	Acres by site productivity class 2/ 20-49	50-84	85-119	120+	Total acres
Illinois					
Shawnee	0	1,395	135	0	1,530
Indiana					
Hoosier	0	0	652	280	932
Kentucky					
Daniel Boone	229	991	4,959	90	6,269
Louisiana					
Kisatchie	0	1,299	5,484	12,639	19,422
Maine					
White Mountain	128	143	51	9	331
Michigan					
Hiawatha	1,692	2,115	297	126	4,230
Huron-Manistee	5,229	3,171	172	0	8,572
Ottawa	0	2,415	806	0	3,221
Subtotal	6,921	7,701	1,275	126	16,023
Minnesota					
Chippewa	437	292	0	0	729
Superior	754	5,212	754	137	6,857
Subtotal	1,191	5,504	754	137	7,586
Mississippi					
Mississippi	925	3,509	8,717	5,378	18,529
Missouri					
Mark Twain	5,924	8,902	146	13	14,985
Montana					
Beaverhead	2,052	1,696	77	0	3,825
Bitterroot	3,340	2,167	1,110	242	6,859
Custer	215	84	75	0	374
Deerlodge	2,272	392	852	89	3,605
Flathead	11,087	1,470	6,415	719	19,691
Gallatin	2,672	2,766	50	16	5,504
Helena	2,605	523	119	0	3,247
Idaho Panhandle	0	0	17	0	17
Kootenai	5,338	5,031	18,840	2,856	32,065
Lewis and Clark	533	842	286	0	1,661
Lolo	1,895	4,471	2,606	414	9,386
Subtotal	32,009	19,442	30,447	4,336	86,234

See footnotes at end of table.

Table 30—Reforestation needs as of October 1, 1986, by State, Forest, and site productivity class—Continued

State, Commonwealth, or Territory 1/ National Forest	Acres by site productivity class 2/ 20-49	50-84	85-119	120+	Total acres
New Hampshire					
White Mountain	657	735	264	44	1,700
New Mexico					
Carson	2,201	6,565	0	0	8,766
Cibola	1,468	2,980	0	0	4,448
Gila	902	1,232	0	0	2,134
Lincoln	0	268	0	0	268
Santa Fe	761	4,944	1,359	0	7,064
Subtotal	5,332	15,989	1,359	0	22,680
New York					
Green Mountain	0	25	75	0	100
North Carolina					
North Carolina	321	3,270	2,727	2,647	8,965
Ohio					
Wayne	0	370	655	659	1,684
Oklahoma					
Ouachita	0	1,969	300	901	3,170
Oregon					
Deschutes	4,461	11,355	4,325	163	20,304
Fremont	3,970	4,811	3,552	90	12,423
Malheur	1,171	4,405	0	0	5,576
Mt. Hood	353	14,129	9,440	1,682	25,604
Ochoco	1,963	3,642	123	0	5,728
Rogue River	0	437	13,039	200	13,676
Siskiyou	4	276	4,833	2,320	7,433
Siuslaw	0	0	0	7,008	7,008
Umatilla	902	3,089	328	0	4,319
Umpqua	0	229	7,433	1,276	8,938
Wallowa-Whitman	2,472	16,993	5,522	0	24,987
Willamette	0	549	7,373	15,903	23,825
Winema	3,684	2,460	1,740	2,878	10,762
Subtotal	18,980	62,375	57,708	31,520	170,583
Pennsylvania					
Allegheny	3,823	4,141	0	0	7,964

See footnotes at end of table.

Table 30—Reforestation needs as of October 1, 1986, by State, Forest, and site productivity class—Continued

State, Commonwealth, or Territory 1/ National Forest	Acres by site productivity class 2/ 20-49	50-84	85-119	120+	Total acres
South Carolina					
South Carolina	0	656	2,881	3,013	6,550
South Dakota					
Black Hills	3,721	0	0	0	3,721
Tennessee					
Cherokee	0	0	1,195	0	1,195
Texas					
Texas	0	1,085	11,921	14,089	27,095
Utah					
Ashley	4,373	1,844	0	0	6,217
Dixie	490	1,080	0	0	1,570
Fishlake	0	298	0	0	298
Manti-LaSal	0	699	0	0	699
Uinta	0	0	668	0	668
Wasatch	136	200	0	0	336
Subtotal	4,999	4,121	668	0	9,788
Vermont					
Green Mountain	224	521	378	0	1,123
Virginia					
George Washington	885	490	189	1,348	2,912
Jefferson	891	1,884	0	501	3,276
Subtotal	1,776	2,374	189	1,849	6,188
Washington					
Colville	111	4,839	1,638	9	6,597
Gifford Pinchot	16	4,143	4,293	2,114	10,566
Idaho Panhandle	39	26	409	385	859
Mt. Baker-Snoqualmie	0	642	4,856	2,692	8,190
Okanogan	2,922	2,914	0	0	5,836
Olympic	0	1,101	7,202	2,939	11,242
Umatilla	0	358	60	0	418
Wenatchee	1,079	4,527	4,789	1,061	11,456
Subtotal	4,167	18,550	23,247	9,200	55,164

See footnotes at end of table.

Table 30—Reforestation needs as of October 1, 1986, by State, Forest, and site productivity class—Continued

State, Commonwealth, or Territory 1/ National Forest	Acres by site productivity class 2/ 20-49	50-84	85-119	120+	Total acres
West Virginia					
George Washington	108	0	0	66	174
Monongahela	0	52	460	145	657
Subtotal	108	52	460	211	831
Wisconsin					
Chequamegon	158	3,365	1,005	98	4,626
Nicolet	449	2,507	486	299	3,741
Subtotal	607	5,872	1,491	397	8,367
Wyoming					
Bighorn	2,091	437	0	0	2,528
Blackhills	154	0	0	0	154
Bridger-Teton	150	620	2,577	0	3,347
Medicine Bow	6,147	956	0	0	7,103
Shoshone	787	0	0	0	787
Targhee	0	858	0	0	858
Subtotal	9,329	2,871	2,577	0	14,777
Total	164,760	291,763	238,526	152,662	847,711

1/ States not listed had no reforestation needs as of October 1, 1986.
2/ Site productivity class refers to the amount of wood produced in cubic feet per acre per year in a natural unmanaged stand.

Table 31—Timber-stand improvement funding and accomplishments by funding source—fiscal years 1982-86

	Appropriated	Knutson-Vandenberg	Total
1982			
Million dollars 1/	26.1	17.2	43.2
1,000 acres	240.2	120.8	361.0
Constant dollars/acre	108.5	142.2	119.8
1983			
Million dollars 1/	37.4 2/	22.5	59.9
1,000 acres	270.6 2/	127.0	397.6
Constant dollars/acre	138.2	176.8	150.7
1984			
Million dollars 1/	27.8	23.3	49.3
1,000 acres	250.1	111.5	361.6
Constant dollars/acre	111.0	209.0	136.4
1985			
Million dollars 1/	34.5	19.8	54.3
1,000 acres	300.5	120.9	421.4
Constant dollars/acre	114.9	164.0	128.9
1986			
Million dollars 1/	**29.0**	**18.8**	**47.8**
1,000 acres	**259.4**	**100.7**	**360.1**
Constant dollars/acre	**111.9**	**186.2**	**132.7**

1/ All dollars are constant 1986. No general administration included. Does not include funds for nursery and tree improvement.
2/ Does not include 158,000 acres of timber-stand improvement accomplished with $20 million of Federal Emergency Jobs Program funding, P.L. 98-8.

Table 32—Timber-stand improvement program needs—fiscal years 1986-88

	Work needs	Annual program, appropriated funds 1/	
	1,000 acres	1,000 acres	Million dollars
10/1/85 balance	**1,452**		
Fiscal year 1986:			
New needs	**+326**		
Accomplishments	**-360**	**259**	**29.0**
10/1/86 balance	1,418		
Fiscal year 1987:			
New needs	+375		
Projected accomplishments	-374	186	26.8
10/1/87 balance	1,419		
Fiscal year 1988:			
New needs	+375		
Projected accomplishments	-322	134	24.6
10/1/88 balance	1,472 2/		

1/ Includes Reforestation Trust Fund pursuant to P.L. 96-451, as amended.
2/ This represents nearly 4 years of future accomplishments.

Table 33—Timber-stand improvement needs as of October 1, 1986, by State, Forest, and cubic foot productivity class

State, Commonwealth, or Territory 1/ National Forest	All timber-stand improvement Cubic foot productivity classes 2/ 20-49	50-84	85-119	120+	Total	Release subtotal	Thinning subtotal	Fertilization subtotal	Pruning subtotal
					Acres				
Alabama									
Alabama	**0**	**1,471**	**1,096**	**108**	**2,675**	**2,675**	**0**	**0**	**0**
Alaska									
Chugach	25	128	709	0	**862**	686	176	0	0
Tongass-Chatham	0	0	1,342	2,445	**3,787**	1,871	1,916	0	0
Tongass-Ketchikan	0	0	0	40,705	**40,705**	1,152	39,553	0	0
Tongass-Stikine	0	0	1,578	12,881	**14,459**	0	14,459	0	0
Subtotal	**25**	**128**	**3,629**	**56,031**	**59,813**	**3,709**	**56,104**	**0**	**0**
Arizona									
Apache-Sitgreaves	3,586	5,849	406	0	**9,841**	0	9,841	0	0
Coconino	0	26,454	0	0	**26,454**	0	26,454	0	0
Kaibab	1,232	14,116	0	0	**15,348**	39	15,309	0	0
Tonto	2,724	5,388	0	0	**8,112**	0	8,112	0	0
Subtotal	**7,542**	**51,807**	**406**	**0**	**59,755**	**39**	**59,716**	**0**	**0**
Arkansas									
Ouachita	74	25,369	4,793	72	**30,308**	24,525	5,783	0	0
Ozark and St. Francis	0	5,432	1,358	0	**6,790**	4,540	2,250	0	0
Subtotal	**74**	**30,801**	**6,151**	**72**	**37,098**	**29,065**	**8,033**	**0**	**0**
California									
Angeles	0	871	0	0	**871**	369	477	25	0
Cleveland	452	1,817	0	0	**2,269**	226	2,043	0	0
Eldorado	0	803	6,433	0	**7,236**	5,847	1,156	233	0
Inyo	46	2,275	0	0	**2,321**	96	2,225	0	0
Klamath	3,555	18,263	24,208	8,030	**54,056**	30,234	23,822	0	0
Lassen	0	2,800	2,613	1,233	**6,646**	2,110	4,536	0	0
Los Padres	350	850	95	0	**1,295**	418	877	0	0
Mendocino	375	4,302	5,348	419	**10,444**	7,820	2,384	240	0
Modoc	1,757	13,152	7,014	1,092	**23,015**	13,872	8,350	793	0
Plumas	1,964	19,096	9,280	5,263	**35,603**	21,426	13,122	1,055	0

See footnotes at end of table.

Table 33—Timber-stand improvement needs as of October 1, 1986, by State, Forest, and cubic foot productivity class—Continued

State, Commonwealth, or Territory 1/ National Forest	All timber-stand improvement Cubic foot productivity classes 2/ 20-49	50-84	85-119	120+	Total	Release subtotal	Thinning subtotal	Fertilization subtotal	Pruning subtotal
					Acres				
San Bernardino	1,011	3,077	413	0	**4,501**	1,183	3,318	0	0
Sequoia	35	3,424	1,905	994	**6,358**	3,808	1,878	672	0
Shasta-Trinity	0	9,689	14,037	14,207	**37,933**	34,019	3,783	131	0
Sierra	1,992	2,975	3,233	1,645	**9,845**	5,646	4,199	0	0
Siskiyou	0	0	449	0	**449**	449	0	0	0
Six Rivers	0	645	23,847	19,395	**43,887**	38,336	5,401	150	0
Stanislaus	0	1,084	6,236	2,163	9,483	7,868	1,615	0	0
Tahoe	6,296	5,264	6,013	18,579	**36,152**	25,752	10,400	0	0
Toiyabe	3,325	3,453	0	0	**6,778**	2,462	4,316	0	0
Subtotal	**21,158**	**93,840**	**111,124**	**73,020**	**299,142**	**201,941**	**93,902**	**3,299**	**0**
Colorado									
Arapaho and Roosevelt	67,238	24,307	0	0	**91,545**	7,936	83,609	0	0
Grand Mesa, Uncompahgre, and Gunnison	2,044	7,963	2,977	0	**12,984**	5,957	7,027	0	0
Pike and San Isabel	3,486	290	0	0	**3,776**	3,333	443	0	0
Rio Grande	3,102	20,166	3,477	0	**26,745**	16,020	10,725	0	0
Routt	53	1,405	0	0	**1,458**	1,350	108	0	0
San Juan	3,080	4,006	0	0	**7,086**	7,006	80	0	0
White River	757	2,273	758	0	**3,788**	3,120	668	0	0
Subtotal	**79,760**	**60,410**	**7,212**	**0**	**147,382**	**44,722**	**102,660**	**0**	**0**
Florida									
Florida	**0**	**6,529**	**2,156**	**199**	**8,884**	**1,406**	**0**	**7,478**	**0**
Georgia									
Chattahoochee and Oconee	**0**	**2,999**	**4,040**	**1,281**	**8,320**	**7,687**	**633**	**0**	**0**
Idaho									
Boise	430	10,352	1,117	1,080	**12,979**	3,711	9,268	0	0
Caribou	0	1,479	275	0	**1,754**	1,254	500	0	0
Challis	334	1,270	0	0	**1,604**	250	1,354	0	0
Clearwater	1,877	22	1,489	5,404	**8,792**	1,225	7,567	0	0

See footnotes at end of table.

Table 33—Timber-stand improvement needs as of October 1, 1986, by State, Forest, and cubic foot productivity class—Continued

State, Commonwealth, or Territory 1/ National Forest	All timber-stand improvement Cubic foot productivity classes 2/ 20-49	50-84	85-119	120+	Total	Release subtotal	Thinning subtotal	Fertilization subtotal	Pruning subtotal
					Acres				
Idaho Panhandle	7,600	3,364	16,167	16,180	**43,311**	10,629	32,682	0	0
Kootenai	23	0	422	403	**848**	458	390	0	0
Nezperce	1,934	989	1,754	305	**4,982**	1,301	3,681	0	0
Payette	599	4,083	1,899	0	**6,581**	1,285	5,296	0	0
Salmon	646	627	0	0	**1,273**	200	1,073	0	0
Sawtooth	200	274	0	0	**474**	188	286	0	0
Targhee	0	1,530	0	0	1,530	118	1,412	0	0
Subtotal	**13,643**	**23,990**	**23,123**	**23,372**	**84,128**	**20,619**	**63,509**	**0**	**0**
Illinois									
Shawnee	22	**697**	72	11	**802**	**716**	**0**	**0**	86
Indiana									
Hoosier	**0**	**0**	**2,634**	**6,036**	**8,670**	**4,601**	**1,807**	**0**	**2,262**
Kentucky									
Daniel Boone	**239**	**1,980**	**8,188**	**188**	**10,595**	**5,434**	**5,093**	**3**	**65**
Louisiana									
Kitsatchie	**0**	**275**	**1,274**	**3,656**	**5,205**	**4,660**	**545**	**0**	**0**
Maine									
White Mountain	**72**	**81**	**29**	**5**	**187**	**130**	**57**	**0**	**0**
Michigan									
Hiawatha	372	5,921	2,043	0	**8,336**	1,655	915	0	5,766
Huron-Manistee	935	3,608	642	0	**5,185**	2,287	2,898	0	0
Ottawa	0	670	220	0	**890**	890	0	0	0
Subtotal	**1,307**	**10,199**	**2,905**	**0**	**14,411**	**4,832**	**3,813**	**0**	**5,766**
Minnesota									
Chippewa	2,000	1,632	0	0	**3,632**	3,332	0	0	300
Superior	472	3,258	472	86	**4,288**	4,288	0	0	0
Subtotal	**2,472**	**4,890**	**472**	**86**	**7,920**	**7,620**	**0**	**0**	**300**

See footnotes at end of table.

Table 33—Timber-stand improvement needs as of October 1, 1986, by State, Forest, and cubic foot productivity class—Continued

State, Commonwealth, or Territory 1/ National Forest	All timber-stand improvement Cubic foot productivity classes 2/ 20-49	50-84	85-119	120+	Total	Release subtotal	Thinning subtotal	Fertilization subtotal	Pruning subtotal
					Acres				
Mississippi									
Mississippi	25	3,827	1,167	4,152	9,171	7,767	891	513	0
Missouri									
Mark Twain	2,457	6,400	79	0	8,936	4,533	4,242	0	161
Montana									
Beaverhead	1,274	1,128	384	38	2,824	681	2,143	0	0
Bitterroot	3,386	866	819	95	5,166	774	4,392	0	0
Custer	768	136	0	0	904	69	835	0	0
Deerlodge	4,272	1,199	263	0	5,734	2,347	3,387	0	0
Flathead	1,584	2,197	7,973	1,675	13,429	915	12,514	0	0
Gallatin	289	1,632	233	113	2,267	195	2,072	0	0
Helena	313	1,003	710	115	2,141	253	1,888	0	0
Idaho Panhandle	0	14	173	15	202	91	111	0	0
Kootenai	3,208	4,745	15,782	7,408	31,143	1,594	29,549	0	0
Lewis and Clark	1,072	528	384	0	1,984	422	1,562	0	0
Lolo	1,255	2,979	2,391	352	6,977	399	6,578	0	0
Subtotal	17,421	16,427	29,112	9,811	72,771	7,740	65,031	0	0
Nebraska									
Nebraska	75	80	0	0	155	0	155	0	0
New Hampshire									
White Mountain	372	416	150	25	963	670	293	0	0
New Mexico									
Carson	8,127	11,685	300	0	20,112	727	19,385	0	0
Cibola	0	11,473	0	0	11,473	0	11,473	0	0
Gila	8,595	49,618	4,794	480	63,487	1,025	62,462	0	0
Lincoln	0	1,158	0	0	1,158	0	1,158	0	0
Santa Fe	758	6,327	1,163	0	8,248	0	8,248	0	0
Subtotal	17,480	80,261	6,257	480	104,478	1,752	102,726	0	0
New York									
Green Mountain	0	798	220	0	1,018	93	925	0	0

See footnotes at end of table.

Table 33—Timber-stand improvement needs as of October 1, 1986, by State, Forest, and cubic foot productivity class—Continued

State, Commonwealth, or Territory 1/ National Forest	All timber-stand improvement Cubic foot productivity classes 2/ 20-49	50-84	85-119	120+	Total	Release subtotal	Thinning subtotal	Fertilization subtotal	Pruning subtotal
					Acres				
North Carolina									
North Carolina	125	1,177	2,647	2,916	6,865	4,464	2,072	329	0
Ohio									
Wayne	0	0	1,387	2,835	4,222	1,320	1,545	0	1,357
Oklahoma									
Ouachita	0	2,868	60	545	3,473	1,906	1,567	0	0
Oregon									
Deschutes	4,175	6,215	7,530	331	18,251	4,126	14,125	0	0
Fremont	5,791	1,818	1,735	0	9,344	1,428	7,916	0	0
Malheur	5,673	14,048	0	28	19,749	171	19,578	0	0
Mt. Hood	0	3,384	10,521	842	14,747	716	8,200	5,831	0
Ochoco	10,624	3,640	0	0	14,264	159	14,105	0	0
Rogue River	0	752	15,212	500	16,464	13,381	1,888	1,195	0
Siskiyou	69	4,619	24,458	7,137	36,283	25,862	7,971	2,450	0
Siuslaw	0	0	0	7,269	7,269	4,206	3,063	0	0
Umatilla	1,521	2,058	215	0	3,794	0	3,694	100	0
Umpqua	25	6,759	25,832	6,300	38,916	9,253	9,500	20,163	0
Wallowa-Whitman	1,184	7,988	1,378	0	10,550	958	9,592	0	0
Willamette	0	583	5,850	19,991	26,424	5,696	9,453	11,275	0
Winema	11,429	4,237	857	206	16,729	434	16,295	0	0
Subtotal	40,491	56,101	93,588	42,604	232,784	66,390	125,380	41,014	0
Pennsylvania									
Allegheny	285	305	0	0	590	0	590	0	0
Puerto Rico									
Caribbean	0	300	1,513	0	1,813	1,213	600	0	0
South Carolina									
South Carolina	0	476	1,908	2,146	4,530	1,181	2,119	1,230	0
South Dakota									
Black Hills	15,686	0	0	0	15,686	0	15,686	0	0
Tennessee									
Cherokee	0	1,099	364	793	2,256	1,111	1,145	0	0

See footnotes at end of table.

Table 33—Timber-stand improvement needs as of October 1, 1986, by State, Forest, and cubic foot productivity class—Continued

State, Commonwealth, or Territory 1/ National Forest	All timber-stand improvement Cubic foot productivity classes 2/ 20-49	50-84	85-119	120+	Total	Release subtotal	Thinning subtotal	Fertilization subtotal	Pruning subtotal
					Acres				
Texas									
Texas	0	490	1,801	1,875	4,166	2,798	1,294	74	0
Utah									
Ashley	3,175	460	0	0	3,635	50	3,585	0	0
Dixie	3,717	10,587	685	0	14,989	876	14,113	0	0
Fishlake	0	280	0	0	280	0	280	0	0
Manti-LaSal	3,320	0	0	0	3,320	0	3,320	0	0
Uinta	0	0	217	0	217	0	217	0	0
Wasatch	50	207	0	0	257	0	257	0	0
Subtotal	10,262	11,534	902	0	22,698	926	21,772	0	0
Vermont									
Green Mountain	1,478	2,527	457	2	4,464	2,626	1,838	0	0
Virginia									
George Washington	0	458	109	786	1,353	1,098	255	0	0
Jefferson	55	2,385	170	612	3,222	1,399	1,793	0	30
Subtotal	55	2,843	279	1,398	4,575	2,497	2,048	0	30
Washington									
Colville	300	5,392	3,281	0	8,973	3,066	5,907	0	0
Gifford Pinchot	58	18,442	11,984	8,664	39,148	309	30,877	7,962	0
Idaho Panhandle	35	43	1,148	564	1,790	308	1,482	0	0
Mt. Baker-Snoqualmie	929	3,923	4,821	2,131	11,804	604	8,783	2,417	0
Okanogan	1,612	1,614	0	0	3,226	28	3,198	0	0
Olympic	92	1,178	4,631	2,412	8,313	766	4,941	2,606	0
Umatilla	518	19,529	4,444	550	25,041	0	1,731	0	0
Wenatchee	0	1,565	166	0	1,731	6,078	18,168	795	0
Subtotal	3,544	51,686	30,475	14,321	100,026	11,159	75,087	13,780	0

See footnotes at end of table.

Table 33--Timber-stand improvement needs as of October 1, 1986, by State, Forest, and cubic foot productivity class--Continued

State, Commonwealth, or Territory 1/ National Forest	All timber-stand improvement Cubic foot productivity classes 2/ 20-49	50-84	85-119	120+	Total	Release subtotal	Thinning subtotal	Fertilization subtotal	Pruning subtotal
					Acres				
West Virginia									
George Washington	0	0	0	65	**65**	65	0	0	0
Monongahela	0	73	638	201	**912**	600	312	0	0
Subtotal	**0**	**73**	**638**	**266**	**977**	**665**	**312**	**0**	**0**
Wisconsin									
Chequamegon	0	884	42	0	**926**	926	0	0	0
Nicolet	0	1,814	1,034	100	**2,948**	1,202	230	0	1,516
Subtotal	**0**	**2,698**	**1,076**	**100**	**3,874**	**2,128**	**230**	**0**	**1,516**
Wyoming									
Bighorn	29,088	882	0	0	**29,970**	26,624	3,346	0	0
Black Hills	1,964	0	0	0	**1,964**	0	1,964	0	0
Bridger-Teton	230	644	1,066	0	**1,940**	0	1,940	0	0
Medicine Bow	3,848	4,327	0	0	**8,175**	1,432	6,743	0	0
Shoshone	8,734	1,565	0	0	**10,299**	1,215	9,084	0	0
Subtotal	**43,864**	**7,418**	**1,066**	**0**	**52,348**	**29,271**	**23,077**	**0**	**0**
Total	**279,934**	**539,901**	**349,657**	**248,334**	**1,417,826**	**492,066**	**846,497**	**67,720**	**11,543**

1/ States not listed had no timber-stand improvement needs as of October 1, 1986.
2/ Cubic foot productivity class refers to the cubic feet of wood produced per acre per year in a natural unmanaged stand.

Table 34—Reforestation and timber-stand improvement acreages certified as satisfactorily stocked, by State and National Forest—fiscal year 1986

State, Commonwealth, or Territory 1/ National Forest	Reforestation					Timber-stand improvement				
	Artificial regeneration		Natural regeneration							
	Planted	Seeded	w/ site prep. 2/	w/o site prep. 2/	Total	Release	Thinning	Fertilization	Pruning	Total
	Acres									
Alabama										
Alabama	2,853	35	1,569	34	4,491	4,884	0	0	0	4,884
Alaska										
Chugach	0	0	0	12	12	0	29	0	0	29
Tongass-Chatam	0	0	0	3,681	3,681	0	149	0	0	149
Tongass-Ketchikan	0	0	0	5,004	5,004	0	1,462	0	0	1,462
Tongass-Stikine	0	0	0	1,271	1,271	0	2,441	0	0	2,441
Subtotal	0	0	0	9,968	9,968	0	4,081	0	0	4,081
Arizona										
Apache-Sitgreaves	878	0	0	0	878	0	0	0	0	0
Coconino	1,275	0	0	0	1,275	0	3,068	0	0	3,068
Coronado	0	0	0	0	0	0	65	0	0	65
Kaibab	567	0	0	0	567	0	0	0	0	0
Prescott	24	0	0	0	24	47	149	0	0	196
Tonto	0	0	0	0	0	1,100	625	0	0	1,725
Subtotal	2,744	0	0	0	2,744	1,147	3,907	0	0	5,054
Arkansas										
Ouachita	7,432	27	399	0	7,858	14,904	745	0	0	15,649
Ozark and St. Francis	2,282	0	2,771	0	5,053	5,696	3,738	0	0	9,434
Subtotal	9,714	27	3,170	0	12,911	20,600	4,483	0	0	25,083
California										
Angeles	0	0	0	0	0	385	0	0	0	385
Eldorado	480	0	0	0	480	769	0	0	0	769
Klamath	962	0	24	0	986	253	243	0	0	496
Lassen	0	0	0	0	0	1,004	1,254	0	0	2,258
Los Padres	100	0	0	0	100	0	0	0	0	0
Mendocino	437	0	0	0	437	0	0	0	0	0
Modoc	2,293	0	0	0	2,293	0	0	0	0	0

See footnotes at end of table.

Table 34—Reforestation and timber-stand improvement acreages certified as satisfactorily stocked, by State and National Forest—fiscal year 1986—Continued

State, Commonwealth, or Territory 1/ National Forest	Reforestation					Timber-stand improvement				
	Artificial regeneration		Natural regeneration							
	Planted	Seeded	w/ site prep. 2/	w/o site prep. 2/	Total	Release	Thinning	Fertili-zation	Pruning	Total
	Acres									
Plumas	654	0	0	0	**654**	717	218	0	0	**935**
San Bernardino	0	0	0	0	**0**	321	0	0	0	**321**
Sequoia	731	0	0	0	**731**	0	282	0	0	**282**
Shasta-Trinity	4,497	0	0	0	**4,497**	700	750	0	0	**1,450**
Sierra	98	0	0	0	**98**	0	0	0	0	**0**
Six Rivers	402	0	0	0	**402**	467	2,219	0	0	**2,686**
Stanislaus	157	0	0	0	**157**	0	0	0	0	0
Tahoe	3,000	0	0	0	**3,000**	800	0	0	0	**800**
Toiyabe	134	0	0	0	**134**	0	392	0	0	**392**
Subtotal	**13,945**	**0**	**24**	**0**	**13,969**	**5,416**	**5,358**	**0**	**0**	**10,774**
Colorado										
Arapaho and Roosevelt	340	94	0	380	**814**	323	407	0	0	**730**
Grand Mesa, Uncompahgre, and Gunnison	30	30	10	0	**70**	0	1,217	0	0	**1,217**
Pike and San Isabel	157	0	0	204	**361**	70	3,293	0	0	**3,363**
Rio Grande	0	0	0	0	**0**	134	665	0	0	**799**
Routt	206	0	228	260	**694**	1,754	370	0	0	**2,124**
San Juan	4,039	0	0	1,483	**5,522**	244	85	0	0	**329**
White River	965	0	0	0	**965**	358	507	0	0	**865**
Subtotal	**5,737**	**124**	**238**	**2,327**	**8,426**	**2,883**	**6,544**	**0**	**0**	**9,427**
Florida										
Florida	**4,981**	**4,768**	**275**	**0**	**10,024**	**0**	**0**	**2,771**	**0**	**2,771**
Georgia										
Chattahoochee and Oconee	**5,747**	**0**	**1,185**	**0**	**6,932**	**5,446**	**109**	**0**	**0**	**5,555**
Idaho										
Boise	130	0	0	0	**130**	867	3,110	0	0	**3,977**
Challis	76	0	0	0	**76**	0	0	0	0	**0**
Clearwater	2,645	0	0	118	**2,763**	292	799	0	0	**1,091**
Idaho Panhandle	3,770	0	1,014	1,089	**5,873**	1,781	3,268	0	0	**5,049**

See footnotes at end of table.

Table 34—Reforestation and timber-stand improvement acreages certified as satisfactorily stocked, by State and National Forest—fiscal year 1986—Continued

State, Commonwealth, or Territory 1/ National Forest	Reforestation					Timber-stand improvement				
	Artificial regeneration		Natural regeneration							
	Planted	Seeded	w/ site prep. 2/	w/o site prep. 2/	Total	Release	Thinning	Fertilization	Pruning	Total
	Acres									
Kootenai	222	0	0	0	222	0	0	0	0	0
Nezperce	2,833	0	433	293	3,559	165	384	0	0	549
Salmon	634	0	0	170	804	0	108	0	0	108
Sawtooth	44	0	0	500	544	0	200	0	0	200
Targhee	17,782	0	606	0	18,388	103	397	0	0	500
Subtotal	28,136	0	2,053	2,170	32,359	3,208	8,266	0	0	11,474
Illinois										
Shawnee	87	0	71	0	158	212	277	0	0	489
Indiana										
Hoosier	147	0	1,535	0	1,682	62	80	0	0	142
Kentucky										
Daniel Boone	2,332	0	2,439	0	4,771	4,147	43	0	0	4,190
Louisiana										
Kisatchie	4,375	581	630	240	5,826	2,048	335	0	0	2,383
Maine										
White Mountain	0	0	0	0	0	53	0	0	0	53
Michigan										
Hiawatha	1,664	220	2,798	641	5,323	456	0	0	0	456
Huron-Manistee	1,408	0	2,492	574	4,474	1,800	462	0	0	2,262
Ottawa	1,202	0	3,832	3,067	8,101	1,879	86	0	0	1,965
Subtotal	4,274	220	9,122	4,282	17,898	4,135	548	0	0	4,683
Minnesota										
Chippewa	2,679	7	2,326	23	5,035	1,963	0	0	0	1,963
Superior	6,296	872	184	546	7,898	7,157	1,247	258	0	8,662
Subtotal	8,975	879	2,510	569	12,933	9,120	1,247	258	0	10,625

See footnotes at end of table.

Table 34—Reforestation and timber-stand improvement acreages certified as satisfactorily stocked, by State and National Forest—fiscal year 1986—Continued

State, Commonwealth, or Territory 1/ National Forest	Reforestation					Timber-stand improvement				
	Artificial regeneration		Natural regeneration							
	Planted	Seeded	w/ site prep. 2/	w/o site prep. 2/	Total	Release	Thinning	Fertili-zation	Pruning	Total
	Acres									
Mississippi										
Mississippi	7,471	87	2,469	0	10,027	4,421	1,137	252	0	5,810
Missouri										
Mark Twain	1,230	595	8,040	53	9,918	3,044	968	0	0	4,012
Montana										
Beaverhead	1,142	0	1,200	625	2,967	0	371	0	0	371
Bitterroot	2,124	24	106	249	2,503	360	710	0	0	1,070
Custer	118	0	0	251	369	136	122	0	0	258
Deerlodge	134	0	50	64	248	362	339	0	0	701
Flathead	2,300	120	314	118	2,852	101	1,634	0	0	1,735
Gallatin	908	0	451	197	1,556	0	1,088	0	0	1,088
Helena	1,606	57	0	0	1,663	0	311	0	0	311
Idaho Panhandle	0	0	0	15	15	129	0	0	0	129
Kootenai	7,490	0	1,802	947	10,239	40	3,703	0	0	3,743
Lewis and Clark	274	0	540	107	921	44	673	0	0	717
Lolo	2,639	66	652	241	3,598	130	1,387	0	0	1,517
Subtotal	18,735	267	5,115	2,814	26,931	1,302	10,338	0	0	11,640
Nevada										
Humboldt	10	0	0	0	10	25	0	0	0	25
New Hampshire										
White Mountain	0	0	346	21	367	622	38	0	0	660
New Mexico										
Carson	929	0	0	0	929	1,479	4,661	0	0	6,140
Cibola	222	0	0	0	222	0	3,152	0	0	3,152
Gila and Apache	661	0	0	0	661	0	3,726	0	0	3,726
Lincoln	418	0	0	0	418	0	435	0	0	435
Santa Fe	577	0	0	0	577	0	6,132	0	0	6,132
Subtotal	2,807	0	0	0	2,807	1,479	18,106	0	0	19,585
New York										
Green Mountain	0	0	0	0	0	0	54	0	0	54
North Carolina										
North Carolina	2,026	0	1,690	0	3,716	1,308	763	0	0	2,071

See footnotes at end of table.

Table 34—Reforestation and timber-stand improvement acreages certified as satisfactorily stocked, by State and National Forest—fiscal year 1986—Continued

State, Commonwealth, or Territory 1/ National Forest	Reforestation					Timber-stand improvement				
	Artificial regeneration		Natural regeneration							
	Planted	Seeded	w/ site prep. 2/	w/o site prep. 2/	Total	Release	Thinning	Fertilization	Pruning	Total
	Acres									
Ohio										
Wayne	158	0	583	0	741	1,098	0	92	0	1,190
Oklahoma										
Ouachita	2,296	0	0	0	2,296	1,962	242	0	0	2,204
Oregon										
Deschutes	8,713	0	388	0	9,101	1,308	1,606	0	0	2,914
Fremont	776	0	0	0	776	0	3,565	0	0	3,565
Malheur	368	0	289	386	1,043	0	2,337	0	0	2,337
Mt. Hood	7,566	72	0	758	8,396	49	3,160	0	0	3,209
Ochoco	657	0	184	0	841	0	0	0	0	0
Rogue River	3,744	0	0	0	3,744	820	319	0	0	1,139
Siskiyou	5,011	0	33	154	5,198	375	626	0	0	1,001
Siuslaw	3,336	0	0	0	3,336	0	0	0	0	0
Umatilla	2,109	0	397	1,474	3,980	0	899	0	0	899
Umpqua	8,207	0	122	30	8,359	0	755	1,052	0	1,807
Wallowa-Whitman	1,593	160	216	1,596	3,565	0	461	0	0	461
Willamette	20,189	172	201	1,792	22,354	149	7,829	5,360	0	13,338
Winema	3,217	0	0	330	3,547	0	2,228	0	0	2,228
Subtotal	65,486	404	1,830	6,520	74,240	2,701	23,785	6,412	0	32,898
Pennsylvania										
Allegheny	0	0	685	199	884	0	1,091	0	0	1,091
Puerto Rico										
Caribbean	0	0	0	0	0	1,110	0	0	0	1,110
South Carolina										
South Carolina	3,465	0	1,467	0	4,932	2,515	704	212	0	3,431
South Dakota										
Black Hills	0	0	0	0	0	0	9,683	0	0	9,683
Tennessee										
Cherokee	1,612	0	1,861	0	3,473	2,427	240	0	0	2,667
Texas										
Texas	2,359	0	536	0	2,895	289	1,440	0	0	1,729

See footnotes at end of table.

Table 34—Reforestation and timber-stand improvement acreages certified as satisfactorily stocked, by State and National Forest—fiscal year 1986—Continued

State, Commonwealth, or Territory 1/ National Forest	Reforestation					Timber-stand improvement				
	Artificial regeneration		Natural regeneration							
	Planted	Seeded	w/ site prep. 2/	w/o site prep. 2/	Total	Release	Thinning	Fertilization	Pruning	Total
	Acres									
Utah										
Ashley	0	0	336	0	**336**	516	250	0	0	**766**
Dixie	381	0	0	0	**381**	0	4,517	0	0	**4,517**
Fishlake	829	0	0	0	**829**	0	135	0	0	**135**
Uinta	26	0	0	0	**26**	0	0	0	0	**0**
Subtotal	**1,236**	**0**	**336**	**0**	1,572	**516**	**4,902**	**0**	**0**	5,418
Vermont										
Green Mountain	**10**	**0**	**185**	**33**	228	**378**	**261**	**0**	**0**	639
Virginia										
George Washington	736	0	1,678	0	**2,414**	484	0	0	0	**484**
Jefferson	680	0	2,420	0	**3,100**	1,271	1,476	0	0	**2,747**
Subtotal	**1,416**	**0**	**4,098**	**0**	5,514	**1,755**	**1,476**	**0**	**0**	3,231
Washington										
Colville	192	0	130	0	**322**	0	447	0	0	**447**
Gifford Pinchot	10,750	0	0	404	**11,154**	25	6,829	1,362	0	**8,216**
Idaho Panhandle	986	0	98	54	**1,138**	0	326	0	0	**326**
Mt. Baker-Snoqualmie	7,867	0	0	0	**7,867**	90	1,221	715	0	**2,026**
Okanogan	103	0	0	0	**103**	141	1,912	0	0	**2,053**
Olympic	4,735	0	0	67	**4,802**	597	2,517	2,375	0	**5,489**
Umatilla	18	0	17	0	**35**	0	0	0	0	**0**
Wenatchee	1,372	0	0	105	**1,477**	328	1,301	0	0	**1,629**
Subtotal	**26,023**	**0**	**245**	**630**	26,898	**1,181**	**14,553**	**4,452**	**0**	20,186
West Virginia										
George Washington	19	0	146	0	**165**	262	0	0	0	**262**
Monongahela	60	0	338	23	**421**	1,181	59	0	0	**1,240**
Subtotal	**79**	**0**	**484**	**23**	586	**1,443**	**59**	**0**	**0**	1,502

See footnotes at end of table.

Table 34—Reforestation and timber-stand improvement acreages certified as satisfactorily stocked, by State and National Forest—fiscal year 1986—Continued

State, Commonwealth, or Territory 1/ National Forest	Reforestation					Timber-stand improvement				
	Artificial regeneration		Natural regeneration							
	Planted	Seeded	w/ site prep. 2/	w/o site prep. 2/	Total	Release	Thinning	Fertilization	Pruning	Total
	Acres									
Wisconsin										
Chequamegon	1,749	0	3,783	15	**5,547**	890	51	26	0	**967**
Nicolet	744	0	3,174	57	**3,975**	1,230	0	0	0	**1,230**
Subtotal	**2,493**	**0**	**6,957**	**72**	**9,522**	**2,120**	**51**	**26**	**0**	**2,197**
Wyoming										
Black Hills	0	0	0	0	**0**	0	1,538	0	0	**1,538**
Bridger-Teton	265	0	0	0	**265**	0	1,260	0	0	**1,260**
Medicine Bow	2,322	0	4,274	30,205	**36,801**	92	840	0	0	**932**
Targhee	12	0	76	0	**88**	0	0	0	0	**0**
Subtotal	**2,599**	**0**	**4,350**	**30,205**	**37,154**	**92**	**3,638**	**0**	**0**	**3,730**
Total	**235,558**	**7,987**	**66,098**	**60,160**	**369,803**	**95,149**	**128,807**	**14,475**	**0**	**238,431**

1/ States not listed had no certification in fiscal year 1986.
2/ W/ site prep. = with site preparation; w/o site prep. = without site preparation.

Table 35—Certification of reforestation and timber-stand improvement acreages, by Region—fiscal year 1986

Region	Reforestation					Timber-stand improvement				
			Natural regeneration							
	Planted	Seeded	With site preparation	Without site preparation	Total	Release	Precommercial thinning	Fertilization	Pruning	Total
	Acres									
Northern	29,191	267	6,660	4,368	**40,486**	3,540	15,120	0	0	**18,660**
Rocky Mountain	8,059	124	4,512	32,532	**45,227**	2,975	18,600	0	0	**21,575**
Southwest	5,551	0	0	0	**5,551**	2,626	22,013	0	0	**24,639**
Intermountain	20,323	0	1,018	670	**22,011**	1,511	10,369	0	0	**11,880**
Pacific Southwest	13,811	0	24	0	**13,835**	5,416	4,966	0	0	**10,382**
Pacific Northwest	90,523	404	1,977	7,096	**100,000**	3,882	38,012	10,864	0	**52,758**
Southern	50,666	5,498	21,535	274	**77,973**	53,174	10,972	3,235	0	**67,381**
Eastern	17,434	1,694	30,372	5,252	**54,752**	22,025	4,674	376	0	**27,075**
Alaska	0	0	0	9,968	**9,968**	0	4,081	0	0	**4,081**
Total	**235,558**	**7,987**	**66,098**	**60,160**	**369,803**	**95,149**	**128,807**	**14,475**	**0**	**238,431**

Table 36—Total recreation use on National Forest System lands by State—fiscal years 1982-86

State, Commonwealth, Territory 1/	1986	1985	1984	1983	1982
			1,000 RVD's 2/		
Alabama	771.0	871.9	1,053.7	1,048.0	1,272.0
Alaska	3,584.6	4,851.7	3,519.6	4,144.0	3,571.4
Arizona	17,451.6	14,664.1	16,376.7	16,557.0	16,912.6
Arkansas	2,213.7	2,206.0	2,251.3	2,292.9	2,543.0
California	55,745.9	55,314.3	55,476.3	53,137.1	55,243.8
Colorado	20,158.7	21,115.7	20,734.9	20,037.9	22,361.7
Florida	2,637.2	2,532.9	2,630.0	3,054.0	2,976.9
Georgia	2,314.5	2,304.0	2,275.6	2,271.5	2,182.8
Idaho	10,342.1	10,220.7	10,505.9	10,117.0	10,610.8
Illinois	972.6	972.7	801.4	799.0	836.1
Indiana	425.1	393.1	388.7	766.1	792.6
Kansas	21.0	19.2	16.5	14.8	30.9
Kentucky	2,162.9	2,152.5	2,090.4	2,066.8	2,373.8
Louisiana	475.7	430.8	480.2	497.1	479.2
Maine	46.1	47.5	51.6	51.5	51.5
Michigan	4,196.7	4,133.6	4,652.5	5,398.4	5,652.3
Minnesota	4,297.5	4,391.9	4,302.5	4,387.2	4,492.7
Mississippi	1,128.3	1,115.8	1,246.0	1,365.8	1,279.6
Missouri	1,693.6	1,761.4	1,706.9	1,964.4	1,959.7
Montana	8,899.8	10,020.7	9,388.1	9,380.6	9,549.8
Nebraska	106.8	115.1	129.4	130.8	146.1
Nevada	2,148.6	2,074.1	2,059.1	2,592.7	2,285.9
New Hampshire	2,259.5	2,374.9	2,286.2	2,333.4	2,212.8
New Mexico	6,015.5	6,975.7	6,416.1	6,870.0	6,554.0
New York	23.2	22.9	22.3	23.0	22.6
North Carolina	4,258.1	3,667.7	4,085.7	4,088.6	4,868.4
North Dakota	142.0	135.5	357.5	133.7	133.9
Ohio	381.0	375.6	376.3	398.7	486.6
Oklahoma	357.0	377.2	398.8	404.8	405.6
Oregon	19,294.9	19,060.6	20,139.5	18,245.5	18,038.6
Pennsylvania	2,067.6	1,948.9	2,000.8	2,282.4	2,090.3
Puerto Rico	845.1	468.5	530.2	544.5	523.9
South Carolina	2,692.4	919.3	1,004.1	1,072.3	1,155.4
South Dakota	2,170.4	3,495.4	2,556.1	2,271.1	2,275.2
Tennessee	1,958.7	2,107.2	2,525.2	2,851.0	2,443.7
Texas	13,179.4	1,623.1	1,965.2	1,868.4	1,867.3
Utah	1,142.9	13,914.3	13,621.1	13,330.4	14,790.7
Vermont	3,498.7	850.5	609.2	606.2	743.6
Virginia	14,863.9	3,511.2	3,516.4	3,993.6	3,629.6
Washington	1,265.6	12,690.2	13,986.8	14,514.5	14,554.6
West Virginia	1,909.8	1,334.0	1,370.4	1,433.2	1,451.8
Wisconsin	5,873.9	1,942.8	1,928.9	1,838.9	1,587.1
Wyoming	539.1	5,902.1	5,719.8	6,529.0	5,996.6
Total	226,532.7	225,407.3	227,553.9	227,707.8	233,437.5

1/ States not listed have no Forest Service recreation program.
2/ One recreation visitor-day (RVD) is the recreation use of National Forest land or water that aggregates 12 visitor-hours. This may entail 1 person for 12 hours, 12 persons for 1 hour, or any equivalent combination of individual or group use, either continuous or intermittent.

Table 37—State summary of total recreation use on National Forest System lands by activity—fiscal year 1986

State, 1/ Commonwealth, or Territory	Camping	Picnicking	Travel (mechanized)	Water sports	Winter sports	Fishing	Hunting	Hiking & mountain climbing
				1,000 RVD's 2/				
Alabama	135.1	28.1	140.9	80.1		56.7	213.4	53.5
Alaska	222.0	48.6	456.5	1,027.9	103.1	402.9	148.3	208.1
Arizona	4,569.4	731.9	6,161.2	1,200.6	173.2	674.0	634.8	665.8
Arkansas	430.5	99.4	387.4	257.2	0.0	291.2	480.9	92.7
California	13,761.4	1,467.8	13,902.3	3,839.6	3,847.9	2,980.7	1,295.0	2,638.8
Colorado	4,106.0	444.4	3,790.3	251.8	4,590.7	1,233.3	946.0	1,286.7
Florida	1,020.4	257.6	262.4	346.7	0.0	152.4	187.4	47.7
Georgia	556.2	90.5	404.3	146.8	1.7	229.1	292.4	219.2
Idaho	2,558.8	322.4	2,301.2	546.6	584.7	840.8	777.0	447.6
Illinois	126.9	43.5	175.2	96.0	0.0	51.3	111.1	103.3
Indiana	123.4	23.7	40.0	67.6	0.0	53.0	42.6	20.4
Kansas	1.0	2.9	9.4	0.0	.1	2.5	3.5	.6
Kentucky	384.6	93.8	370.9	445.0	.8	247.0	161.7	195.3
Louisiana	87.7	32.8	74.0	35.9	0.0	36.6	126.5	17.4
Maine	12.9	2.1	3.3	.7	.8	3.6	4.9	9.5
Michigan	886.2	90.8	1,367.9	365.0	78.3	405.3	554.2	91.7
Minnesota	1,077.7	45.6	537.7	777.7	152.2	701.6	318.4	100.8
Mississippi	162.9	47.1	277.3	81.9	0.0	58.9	385.7	62.0
Missouri	312.7	85.6	354.3	268.0	.1	104.4	287.1	76.6
Montana	1,688.5	232.8	2,208.6	226.1	541.9	745.2	964.9	590.3
Nebraska	25.5	8.1	15.3	3.6	.1	4.1	11.0	8.8
Nevada	399.5	190.8	309.3	148.4	185.8	99.1	171.3	110.3
New Hampshire	531.0	52.4	478.9	28.2	380.9	21.3	34.9	423.1
New Mexico	1,471.5	523.6	1,112.3	80.6	288.6	280.3	552.6	508.2
New York	7.9	2.1	1.0	0.0	1.3	1.3	5.1	1.5
North Carolina	922.8	169.6	1,162.0	268.0	2.1	218.5	552.4	481.9
North Dakota	15.1	5.8	21.0	2.8	1.5	1.5	71.0	2.1
Ohio	37.7	27.9	81.7	21.6	3.3	22.8	106.0	34.6
Oklahoma	46.7	20.3	122.8	21.6	0.0	19.3	62.9	17.3
Oregon	5,155.1	593.9	3,961.3	1,147.4	891.2	1,046.4	1,340.2	1,180.9
Pennsylvania	513.3	25.8	369.6	121.5	5.2	246.0	471.2	89.8
Puerto Rico	9.0	208.5	62.0	69.2	0.0	0.0	0.0	71.8
South Carolina	170.7	41.2	202.7	72.3	0.0	61.3	162.9	37.2
South Dakota	151.7	35.8	1,706.5	47.3	30.9	66.9	136.1	115.4
Tennessee	527.6	211.9	483.0	274.2	.6	148.0	186.9	107.7
Texas	434.2	52.2	152.3	147.1	0.0	847.3	204.3	32.2
Utah	4231.0	709.6	2,602.1	470.4	847.2	1,058.9	778.8	774.1
Vermont	43.4	18.9	101.8	15.1	782.8	6.8	36.2	36.5
Virginia	691.6	166.8	751.0	145.4	5.8	283.0	626.3	243.5
Washington	3,874.5	366.8	2,856.8	342.0	926.0	599.5	869.6	839.5
West Virginia	407.4	44.0	187.0	33.0	2.5	133.3	283.8	75.4
Wisconsin	413.5	28.6	562.7	159.1	22.5	379.6	212.1	34.7
Wyoming	1,360.8	142.3	1,195.0	142.7	275.9	391.8	465.0	585.4
Total	53,665.8	7,838.3	51,723.2	13,822.7	14,729.7	15,207.5	15,276.4	12,739.9

1/ States not listed have no Forest Service recreation program.
2/ One recreation visitor-day (RVD) is the recreation use of National Forest land or water that aggregates 12 visitor-hours. This may entail 1 person for 12 hours, 12 persons for 1 hour, or any equivalent combination of individual or group use, either continuous or intermittent.

Horseback riding	Recreation cabin use	Nature study	Sightseeing	Visitor information service users	Other rec. use	Total use	State, 1/ Commonwealth, or Territory
				1,000 RVD's 2/			
8.2		10.1	16.2	11.7	17.0	771.0	Alabama
3.2	110.3	34.5	656.2	99.3	63.7	3,584.6	Alaska
264.9	285.4	121.5	722.8	270.6	975.5	17,451.6	Arizona
31.9	7.6	13.6	25.0	34.2	62.1	2,213.7	Arkansas
772.1	3,290.4	340.6	2,124.6	607.6	4,877.1	55,745.9	California
407.4	228.6	116.9	1,635.4	245.2	876.0	20,158.7	Colorado
24.7	137.4	23.5	37.9	35.6	103.5	2,637.2	Florida
26.9	25.9	27.8	214.7	20.2	58.8	2,314.5	Georgia
278.8	252.0	63.8	421.2	139.6	807.6	10,342.1	Idaho
54.0	0.0	46.0	110.4	16.0	38.9	972.6	Illinois
31.3	0.0	3.4	3.2	5.4	11.1	425.1	Indiana
.2	0.0	.5	0.0	0.0	.3	21.0	Kansas
29.2	11.2	32.6	96.6	45.1	49.1	2,162.9	Kentucky
5.6	4.3	3.6	4.5	11.7	35.1	475.7	Louisiana
0.0	0.0	2.3	2.7	.7	2.6	46.1	Maine
16.3	79.0	25.8	71.7	35.9	128.6	4,196.7	Michigan
7.9	194.4	21.5	21.1	47.1	293.8	4,297.5	Minnesota
18.8	0.0	6.1	6.4	7.7	13.5	1,128.3	Mississippi
33.4	0.0	18.6	53.1	11.6	88.1	1,693.6	Missouri
346.3	203.3	94.1	287.0	235.5	535.3	8,899.8	Montana
5.1	0.0	3.5	.3	5.4	16.0	106.8	Nebraska
44.1	22.8	36.5	72.9	206.9	150.9	2,148.6	Nevada
.4	0.0	10.2	197.0	12.1	89.1	2,259.5	New Hampshire
137.3	80.5	81.1	254.4	130.0	514.2	6,015.5	New Mexico
1.4	0.0	.6	0.0	0.0	1.0	23.2	New York
45.0	6.7	40.6	237.8	68.9	81.8	4,258.1	North Carolina
4.8	0.0	.9	10.2	3.0	2.3	142.0	North Dakota
11.6	0.0	4.6	3.4	9.5	16.3	381.0	Ohio
3.7	0.0	1.4	25.7	9.0	6.3	357.0	Oklahoma
211.4	376.4	327.4	1,129.5	398.4	1,535.4	19,294.9	Oregon
4.4	46.2	12.9	110.9	12.2	38.6	2,067.6	Pennsylvania
0.0	2.0	7.5	15.5	65.1	28.5	539.12	Puerto Rico
17.5	0.0	15.2	24.5	14.6	25.0	845.1	South Carolina
33.3	87.7	15.9	130.9	44.5	89.5	2,692.4	South Dakota
25.0	40.3	20.4	47.8	17.4	79.6	2,170.4	Tennessee
11.1	0.0	9.6	38.0	15.4	15.0	1,958.7	Texas
342.6	253.7	59.0	309.3	112.7	648.0	13,179.4	Utah
2.7	.4	4.3	27.4	11.4	55.2	1,142.9	Vermont
87.5	0.0	55.5	272.4	35.0	134.9	3,498.7	Virginia
197.5	972.0	124.0	1,427.7	324.8	1,143.2	14,863.9	Washington
5.1	.7	5.4	12.5	19.7	55.8	1,265.6	West Virginia
3.7	14.2	7.7	8.7	5.7	57.0	1,909.8	Wisconsin
203.2	190.7	153.2	261.8	76.0	430.1	5,873.9	Wyoming
3,741.5	6,924.1	2,004.2	11,129.3	3,478.7	14,251.4	226,532.7	Total

Table 38—Trail miles on the National Forest System by State—fiscal years 1984-86 1/

State, Commonwealth, or Territory 2/	1986			1985			1984		
	Total	Constructed 3/	Maintained	Total	Constructed 3/	Maintained	Total	Constructed 3/	Maintained
Alabama	230	0	96	230	5	97	230	6	119
Alaska	700	6	545	676	29	647	635	16	620
Arizona	3,546	7	1,800	3,546	0	1,773	3,546	14	2,305
Arkansas	515	1	145	431	0	165	437	3	266
California	11,030	150	6,264	11,030	160	8,825	11,030	138	7,728
Colorado	8,288	226	4,595	8,288	12	4,903	8,288	0	6,235
Florida	267	0	126	268	1	153	267	1	228
Georgia	523	0	320	507	10	482	521	1	435
Idaho	16,316	80	6,887	16,415	131	8,532	17,143	95	10,131
Illinois	205	0	205	205	4	154	203	0	158
Indiana	142	0	90	142	0	78	114	36	63
Kentucky	540	8	195	540	7	184	533	8	619
Louisiana	114	0	41	130	11	80	119	5	39
Maine	108	0	108	78	0	31	78	0	31
Michigan	2,076	54	1,537	2,044	32	1,303	2,029	11	1,239
Minnesota	2,624	23	2,415	2,647	68	1,791	2,581	49	1,749
Mississippi	392	3	87	385	0	86	382	0	131
Missouri	603	10	568	600	13	132	574	17	247
Montana	12,818	93	6,196	13,000	58	7,191	13,000	259	6,308
Nebraska	39	1	24	39	0	27	39	0	30
Nevada	1,523	26	361	1,529	60	932	1,668	0	931
New Hampshire	1,275	0	1,364	1,275	2	485	1,269	0	482
New Mexico	3,098	18	1,500	3,098	15	1,549	3,098	18	2,014
New York	25	0	25	25	0	13	25	0	13
North Carolina	1,457	1	732	1,458	12	607	1,457	1	576
Ohio	122	5	104	117	0	59	117	0	59
Oklahoma	82	0	0	82	0	0	82	0	0
Oregon	7,253	90	4,893	7,253	88	5,437	7,253	39	6,254
Pennsylvania	355	0	342	355	0	355	355	0	355
Puerto Rico	31	1	12	31	0	27	31	3	6
South Carolina	516	0	132	516	3	185	515	1	282
South Dakota	138	3	137	138	24	95	138	28	107
Tennessee	576	0	162	246	0	122	246	0	182
Texas	183	8	125	193	10	187	183	0	271
Utah	5,009	100	2,652	5,009	19	3,154	5,108	1	3,304
Vermont	588	2	613	588	11	294	582	4	291
Virginia	1,865	20	380	1,763	7	377	1,768	5	737
Washington	6,998	142	4,529	6,998	140	5,032	6,998	81	5,591
West Virginia	837	0	305	839	3	163	835	1	177
Wisconsin	1,335	0	841	1,335	0	882	1,255	32	803
Wyoming	5,419	14	3,268	5,419	52	3,760	5,681	1	3,908
Total	99,761	1,092	54,721	99,468	987	60,349	100,413	874	65,024

1/ Includes work accomplished by Human Resource Programs and volunteers.
2/ States not listed have no Forest Service recreation program.
3/ Miles constructed includes construction of new trails and reconstruction of existing trails. The predominant activity

Table 39—Status of the National Forest System units of the National Wilderness Preservation System—calendar years 1982-86

State, Commonwealth, or Territory 1/	1986	1985	1984	1983	1982
			1,000 acres 2/		
Alabama	19	19	19	19	13
Alaska	5,453	5,453	5,453	5,453	5,453
Arizona	1,316	1,320	1,320	557	557
Arkansas	116	116	116	25	25
California	3,920	3,920	3,920	2,139	2,139
Colorado	2,584	2,586	2,586	2,561	2,561
Florida	73	73	73	23	23
Georgia	89	47	47	32	32
Idaho	3,957	3,827	3,827	3,825	3,825
Indiana	13	13	13	13	0
Kentucky	18	18	5	5	5
Louisiana	9	9	9	9	9
Minnesota	798	798	798	793	793
Mississippi	5	5	5	0	0
Missouri	63	63	63	47	40
Montana	3,371	3,366	3,366	3,107	3,107
Nebraska	8	0	0	0	0
Nevada	65	65	65	65	65
New Hampshire	103	103	103	26	26
New Mexico	1,391	1,387	1,387	1,402	1,402
North Carolina	101	100	100	31	31
Oregon	2,078	2,077	2,077	1,214	1,214
Pennsylvania	10	10	10	0	0
South Carolina	17	17	17	17	17
South Dakota	10	10	10	10	10
Tennessee	67	33	33	8	8
Texas	35	34	34	0	0
Utah	780	780	780	30	30
Vermont	59	59	59	17	17
Virginia	65	65	65	9	9
Washington	2,573	2,521	2,521	1,501	1,501
West Virginia	78	78	78	77	30
Wisconsin	44	44	44	20	20
Wyoming	3,081	3,086	3,086	2,193	2,193
Total	32,373 3/	32,102	32,089	25,228	25,155

1/ States not listed have no National Forest System acres in the National Wilderness Preservation System.
2/ Acreage for most states is estimated pending final map compilation.
3/ Includes all acres added to or deleted from the Wilderness Preservation System through the end of the 99th Congress.

Table 40—Additions to the National Wilderness Preservation System—fiscal year 1986 1/

Public Law	State	Date	Number of new areas	Number of additions	Number of adjustments	Acres
99-555	Georgia	10/27/86	4	1	0	42,258
99-197	Kentucky	12/23/85	1	0	0	13,300
99-504	Nebraska	10/22/86	1	0	0	8,100
99-490	Tennessee	10/16/86	5	1	0	33,735
99-584	Texas	10/29/86	0	4	1	1,071
Total			11	6	1	98,464

1/ Includes all acres added to the Wilderness Preservation System by the 99th Congress.

Table 41—Additions to the National Wild and Scenic Rivers System—fiscal year 1986 1/

River	State	Date	Miles
Horse Pasture	North Carolina	10/27/86	4
Cache la Poudre	Colorado	10/30/86	76
Saline Bayou	Louisiana	10/30/86	19
Black Creek	Mississippi	10/30/86	21
Klickitat	Washington	11/17/86	10
White Salmon	Washington	11/17/86	9
Total			139

1/ Includes all rivers added to the National Wild and Scenic Rivers System by the 99th Congress.

Table 42—Wildlife and fish habitat improvement by Region—fiscal year 1986

Region	Wildlife	Resident & Anadromous fish	Threatened, endangered, & sensitive species	Total 1/
Northern				
Acres	4,204	307	302	4,813
Structures	150	296	2	448
Rocky Mountain				
Acres	18,109	43	0	18,152
Structures	498	515	33	1,046
Southwestern				
Acres	6,935	67	8,139	15,141
Structures	34	83	49	166
Intermountain				
Acres	9,673	146	436	10,255
Structures	145	1,398	28	1,571
Pacific Southwest				
Acres	6,822	362	378	7,562
Structures	75	361	114	550
Pacific Northwest				
Acres	1,947	361	20	2,328
Structures	100	1,354	6	1,460
Southern				
Acres	47,367	1,546	19,279	68,192
Structures	90	203	16	309
Eastern				
Acres	17,839	3,678	3,876	25,393
Structures	1,173	779	5	1,957
Alaska				
Acres	1,211	2,180	0	3,391
Structures	34	51	0	85
Total				
Acres	114,107	8,690	32,430	155,227
Structures	2,299	5,040	253	7,592

1/ Does not include activities that are accomplished in support of other resource programs.

Table 43—Range allotment management status by Region—fiscal year 1986

Region	Number of allotments			Acres	
	Total	Improved management started	Improved management maintained	Total	Suitable 1/
Northern	1,689	29	1,347	12,132,440	4,185,151
Rocky Mountain	2,384	94	1,906	18,827,455	8,378,557
Southwestern	1,504	50	1,109	19,446,559	13,080,927
Intermountain	1,881	34	1,481	26,297,601	11,298,286
Pacific Southwest	798	100	568	11,704,874	4,410,264
Pacific Northwest	1,458	24	488	11,951,092	6,751,783
Southern	483	2	448	2,087,081	1,993,614
Eastern	190	5	156	95,353	47,191
Total	10,387	338	7,503	102,542,455	50,145,773

1/ Suitable acres are acres accessible to livestock and which can be grazed on a sustained yield basis without damage to the resource.

Table 44—Range allotment management status—fiscal years 1982-86

	1986	1985	1984	1983	1982
Total allotments 1/	10,387	10,223	10,296	10,417	11,069
Improved management started (number of allotments)	338	351	471	534	705
Improved management maintained (number of allotments)	7,503	7,237	7,018	7,125	6,886
Total acres (million acres)	103	105	105	104	105
Suitable acres (million acres)	50	50	51	52	52
Permitted use (million AUM's 2/)	10.1	10.1	10.1	10.1	9.9
Actual use (million AUM's)	8.7	8.8	8.8	8.8	8.8

1/ Does not include vacant allotments.
2/ An animal unit month (AUM) is the amount of forage required by a 1,000-pound cow or the equivalent for 1 month.

Table 45—Actual grazing use by State—fiscal year 1986

State, Commonwealth, or Territory 1/	Cattle	Sheep	Domestic horses	Wild horses	Wild burros	Total
			AUM's 2/			
Alabama	2,821	0	10	0	0	2,831
Arizona	1,275,402	10,923	7,777	72	533	1,294,707
Arkansas	32,470	0	96	0	0	32,566
California	490,401	55,331	13,923	6,878	569	567,102
Colorado	783,036	140,868	23,651	0	0	947,555
Florida	28,533	0	0	0	0	28,533
Georgia	6,003	0	0	0	0	6,003
Idaho	637,147	221,945	14,055	0	0	873,147
Illinois	15,175	2,691	72	0	0	17,938
Indiana	700	0	0	0	0	700
Kansas	34,812	0	195	0	0	35,007
Kentucky	70	0	0	0	0	70
Louisiana	5,122	0	2	0	0	5,124
Michigan	1,313	0	0	0	0	1,313
Minnesota	1,223	0	0	0	0	1,223
Mississippi	7,952	0	0	0	0	7,952
Missouri	28,940	0	23	0	0	28,963
Montana	558,476	19,889	13,539	0	0	591,904
Nebraska	85,401	0	334	0	0	85,735
Nevada	269,145	51,142	2,193	3,030	0	325,510
New Mexico	721,804	26,986	11,133	1,824	22	761,769
New York	9,301	0	1	0	0	9,302
North Dakota	477,707	122	4,502	0	0	482,331
Ohio	607	0	0	0	0	607
Oklahoma	24,205	0	22	0	0	24,227
Oregon	450,664	41,083	2,719	2,448	0	496,914
South Carolina	209	0	0	0	0	209
South Dakota	465,145	4,629	722	0	0	470,496
Texas	87,319	0	122	0	0	87,441
Utah	466,906	193,822	3,189	0	0	663,917
Vermont	292	4	0	0	0	296
Virginia	6,707	0	696	0	0	7,403
Washington	105,969	9,372	3,533	0	0	118,874
West Virginia	11,061	245	22	0	0	11,328
Wisconsin	125	0	0	0	0	125
Wyoming	510,413	147,403	11,768	0	0	669,584
Total	7,602,576	926,455	114,299	14,252	1,124	8,658,706

1/ States not listed had no Forest Service grazing program in 1986.
2/ An animal unit month (AUM) is the amount of forage required by a 1,000-pound cow, or the equivalent for 1 month.

Table 46—Annual grazing statistics—fiscal year 1986

	Permittees 1/	Cattle		Horses and burros		Sheep and goats		Total	
		Number	AUM's 2/	Number	AUM's	Number	AUM's	Number	AUM's
Permitted to graze		1,463,204	8,789,282	109,281	103,229	1,476,559	1,180,311	3,049,044	10,072,822
Actually grazed:									
Paid permits	14,284	1,334,639	7,578,025	17,423	59,647	1,132,093	920,331	2,484,155	8,558,003
Free use:									
Recreation stock	71,418	60	163	108,682	45,449	0	0	108,742	45,612
Other free use	206	2,121	17,070	1,052	7,658	870	2,815	4,043	27,543
Private Land Permit 3/	(519)	(82,419)	(464,883)	(655)	(7,302)	(25,244)	(25,233)	(108,318)	(497,418)
Crossing	87	23,068	3,756	36	39	35,341	3,246	58,445	7,041
Unauthorized use	72	1,955	3,562	151	1,506	96	63	2,202	5,131
Total 3/	86,067	1,361,843	7,602,576	127,344	114,299	1,168,400	926,455	2,657,587	8,643,330
Wild horses				1,136	14,252			1,136	14,252
Wild burros				194	1,124			194	1,124
Total actually grazed 3/	86,067	1,361,843	7,602,576	128,674	129,675	1,168,400	926,455	2,658,917	8,658,706

1/ Permittees holding paid permits are not counted in other categories.
2/ An animal unit month (AUM) is the amount of forage required by a 1,000-pound cow, or the equivalent for 1 month.
3/ Private Land Permit data not included in totals.

Table 47—Range improvements by type—fiscal year 1986

Improvement type	Unit of measure	Units of construction completed	Total cost
Structural:			
Water developments	Sites	1,009	2,178,431
Range fence	Miles	990	4,366,480
Pipeline	Miles	120	510,620
Other structural facilities	Sites	209	1,232,819
Subtotal		N/A 1/	8,288,350
Nonstructural:			
Cover manipulation, brush	Acres	37,460	443,783
Range plant control	Acres	7,701	213,924
Forage improvement	Acres	53,671	609,592
Noxious farm weed control	Acres	23,307	855,262
Subtotal		122,139	2,122,561
Total		N/A	10,410,911

1/ N/A = not applicable.

Table 48—Road and bridge construction and reconstruction by State—fiscal year 1986

State, Commonwealth, or Territory 1/	From appropriated funds			By timber purchasers		
	Roads	Bridges	Cost 2/	Roads 3/	Bridges	Cost
	Miles	Number	1,000 dollars	Miles	Number	1,000 dollars
Alabama	8.2	3	1,244.0	30.8	0	544.0
Alaska	0.0 4/	5 4/	1,819.0 4/	79.4	2	4,792.1
Arizona	10.6	0	4,603.6	266.5	0	2,141.6
Arkansas	18.2	2	3,192.0	103.0	0	2,138.0
California	33.0	2	22,895.9	735.6	6	15,032.1
Colorado	55.1	5	7,048.0	119.0	0	1,221.0
Florida	11.3	0	924.0	43.7	0	703.0
Georgia	7.0	2	3,370.0	36.1	0	447.0
Idaho	216.3	8	19,307.1	441.0	0	5,039.1
Illinois	5.6	0	649.1	13.1	0	256.0
Indiana	0.0	0	100.0	0.0	0	0.0
Kentucky	29.5	2	1,551.0	30.6	0	241.0
Louisiana	9.0	1	1,160.0	6.7	1	64.0
Maine	0.0	0	80.0	0.0	0	0.0
Michigan	64.9	1	3,290.0	63.5	0	318.8
Minnesota	41.2	1	3,480.8	28.7	0	298.6
Mississippi	12.1	0	1,169.0	116.0	0	985.0
Missouri	37.1	0	1,094.0	22.8	0	115.0
Montana	262.0	7	20,551.0	384.4	0	5,227.0
Nebraska	1.5	0	51.0	0.0	0	0.0
Nevada	0.0	1	289.9	0.0	0	0.0
New Hampshire	6.0	3	546.0	10.8	0	160.9
New Mexico	39.8	1	5,958.8	216.8	0	1,802.3
North Carolina	54.7	0	3,663.0	95.0	0	1,427.0
North Dakota	0.0	0	213.0	0.0	0	0.0
Ohio	3.9	0	544.1	3.6	0	48.1
Oklahoma	0.0	0	85.0	11.4	0	254.0
Oregon	65.0	7	27,807.0	1,353.9	0	31,822.0
Pennsylvania	3.5	0	742.2	14.1	0	223.5
Puerto Rico	0.0	0	74.0	0.0	0	0.0
South Carolina	8.9	5	1,161.0	87.3	1	1,349.0
South Dakota	29.4	1	2,143.8	22.3	0	332.0
Tennessee	18.2	4	1,671.0	40.1	0	336.0
Texas	0.6	0	740.0	9.1	0	285.0
Utah	11.8	8	3,993.0	51.7	0	703.7
Vermont	4.5	0	558.7	1.2	0	24.3
Virginia	52.0	2	2,826.0	40.9	0	395.0
Washington	14.7	0	13,510.0	296.0	0	11,200.0
West Virginia	35.8	0	2,092.4	24.5	0	408.0
Wisconsin	43.2	1	3,919.6	26.0	0	206.6
Wyoming	36.9	2	3,667.1	82.8	0	933.3
Total	1,251.5	74	173,785.1 5/	4,908.4	10	91,474.0

1/ States not listed had no Forest Service road programs in 1986.
2/ Includes funds for engineering and program support for appropriated roads and timber purchaser roads.
3/ Does not include 256.8 miles turned back to Forest Service for construction.
4/ Does not include Tongass Timber Supply Fund, $17,845,000, 60.7 miles, and 15 bridges.
5/ Does not include $5,694.3 of Washington Office funds.

Table 49—Timber purchaser roads constructed by the Forest Service by State—fiscal year 1986

State or Commonwealth 1/	Roads constructed	Cost
	Miles	1,000 dollars
Alabama	2.7	59.0
Arizona	19.6	59.6
Arkansas	9.4	219.0
California	2.4	1,223.1
Colorado	0.0	23.0
Florida	10.1	291.0
Georgia	0.0	94.0
Idaho	41.4	343.0
Illinois	1.9	22.5
Kentucky	3.5	30.0
Minnesota	2.1	95.7
Mississippi	0.0	9.0
Montana	57.7	1,018.4
Ohio	1.6	27.1
Oregon	57.1	1,879.0
Pennsylvania	6.0	87.2
South Carolina	4.4	142.0
South Dakota	28.8	238.0
Virginia	0.0	12.0
Washington	1.7	252.0
West Virginia	0.7	36.6
Wisconsin	5.7	56.8
Total	256.8	6,218.0

1/ States not listed had no timber purchaser roads constructed by the Forest Service in 1986.

Table 50—State and Private Forestry funding—fiscal year 1986 compared to 1982-86 average

	1986		1982-86	Percent of
	Actual	RPA	average	actual to average
	1,000 constant 1986 dollars 1/			
Appropriated accounts				
Forest pest management	**28,329**	28,168	29,434	96
Fire protection	**13,032**	13,032	14,872	88
Forest management and utilization	**9,518**	9,518	16,536	58
Special projects	**4,442**	4,442	5,176 2/	86
Subtotal	**55,321**	55,160	66,018	85
Transfer accounts				
Rural community fire protection	**3,091**	-- 3/	3,296 4/	94
Watershed and flood prevention	**4,504**	--	4,029 4/	112
Watershed planning	**221**	--	244 4/	91
Resource conservation and development	**693**	--	778 4/	89
River basin surveys and investigations	**1,012**	--	1,156 4/	88
Forestry Incentives Program 5/	**1,243**	--	1,286 4/	97
Agricultural Conservation Program 5/	**1,889**	--	1,954 4/	97
Subtotal	**12,653**	--	12,743	99
Total	**67,974**	55,160	78,761	86

1/ Survey of Current Business (BEA) index values used for 1982-85. BEA updates gross national product implicit price deflators periodically. These are current as of June 1986.
2/ Based on 4-year average.
3/ -- = not reported in the RPA.
4/ Based on 3-year average.
5/ Includes only technical assistance allocated for the Forestry Incentives and Agriculture Conservation Programs (administered jointly by ASCS and FS).

Table 51—State and Private Forestry funding—fiscal years 1982-86

	1986	1985	1984	1983	1982
			1,000 dollars		
Appropriated accounts					
Forest pest management	**28,329**	28,825	29,179	27,844	23,760
Fire protection	**13,032**	13,739	14,016	14,411	14,193
Forest management and utilization	**9,518**	10,756	10,713	17,080	22,522
Special projects	**4,442**	4,972	6,845	3,500	5,080
Subtotal	**55,321**	58,292	60,753	62,835	65,555
Transfer accounts					
Rural community fire protection	**3,110**	3,250	3,250	3,250	3,250
Watershed and flood prevention	**3,948**	3,580	3,670	3,670	5,105
Watershed planning	**221**	240	250	250	307
Resource conservation and development	**693**	802	768	768	722
River basin surveys and investigations	**1,040**	1,117	1,229	1,229	1,484
Forestry Incentives Program 1/	**1,196**	1,250	1,250	1,250	1,250
Agricultural Conservation Program 1/	**1,818**	1,900	1,900	1,900	1,900
Subtotal	**12,026**	12,139	12,317	12,317	14,018
Total	**67,347**	70,431	73,070	75,152	79,573

1/ Includes only technical assistance allocated for the Forestry Incentives and Agriculture Conservation Programs (administered jointly by ASCS and FS.)

Table 52—Summary of State and Private Forestry accomplishments compared to funded output levels—fiscal year 1986

	Unit of measure 1/	1986 Funded	1986 Accomplished	1986 Percent of funded	1982-86 average accomplishment	1986 as percent of 5-year average
Appropriated accounts						
Forest pest management 2/						
Insect and disease management surveys	MM acres	555	594	107	567	105
Insect and disease suppression	MM acres	-- 3/	0.80	--	1.53	52
Insect and disease special projects	Projects	25	25	100	32	78
Forest management and utilization						
Forest resource management						
Forest land management plans	MM acres	3.5	3.8	109	3.6	106
Timber prepared for harvest	MM cubic ft	--	252.0	--	257.0	98
Reforestation 4/	M acres	--	667.1	--	581.8	115
Timber-stand improvement 4/	M acres	--	282.4	--	303.7	93
Woodland owners assisted	M owners	--	137.8	--	140.2	98
Wood utilization	MM cubic ft	--	--	--	--	--
Seedling, nursery, and tree improvement	MM seedlings	725	707.5	98	742.3	95
Urban forestry assistance	Areas assisted	--	5,363	--	4,313.6	124
Management improvement						
State forest-resource planning	Person Years	--	28	--	5/	5/
Transfer accounts						
Rural community fire protection, FmHA	M approved applications	1.7	1.7	100	2.7	65
Watershed and flood prevention, SCS	Projects	76	76	100	84.2	90
Watershed planning, SCS	Plans	58	58	100	57.8	100
Resource conservation and development, SCS	Projects	45	45	100	52.6	86
River basin surveys and investigations, SCS	Plans	44	44	100	42.6	103
Forestry Incentives Program, ASCS						
Reforestation	M acres	6/	174.3	--	156.9	111
Timber-stand improvement	M acres	6/	26.4	--	45.9	58
Agriculture Conservation Program, ASCS						
Reforestation	M acres	6/	86.4	--	68.9	125
Timber-stand improvement	M acres	6/	17.8	--	32.2	55

1/ M = thousand, MM = million.
2/ Includes accomplishments on National Forest System and other Federal lands, as well as State and private lands.
3/ -- = not applicable.
4/ Includes Forestry Incentives Program and Agriculture Conservation Program accomplishments.
5/ Not reported due to change in unit of measure from MM acres to person years.
6/ Funded targets for Forestry Incentives and Agriculture Conservation Program were included with those of Rural Forestry Assistance above.

Table 53—Summary of State and Private Forestry accomplishments compared to RPA—fiscal year 1986

	Unit of measure 1/	1986 RPA recommended level	1986 Accomplished	1986 Percent of RPA accomplished
Appropriated accounts				
Forest pest management				
Insect and disease management surveys	MM acres	555	594	107
Insect and disease suppression	MM acres	-- 2/	0.8	--
Insect and disease special projects	Projects	--	25	--
Forest Management and Utilization				
Forest resource management				
Forest land management plans	MM acres	2.8	3.8	136
Timber prepared for harvest	MM cubic ft	--	252.0	--
Reforestation 3/	M acres	403	667.1	166
Timber-stand improvement 3/	M acres	195	282.4	145
Woodland owners assisted	M owners	--	137.8	--
Wood utilization	MM cubic ft	88	N/A 4/	N/A
Seedling, nursery and tree improvement	MM seedlings	--	707.5	--
Urban forestry assistance	Areas assisted	--	5,363	--
Management improvement				
State forest resource planning	Person years 5/	55		
Transfer accounts				
Rural community fire protection, FmHA	M approved applications	--	1.7	--
Watershed and flood prevention, SCS	Projects	-- 6/	76	--
Watershed planning, SCS	Plans	-- 6/	58	--
Resource conservation and development, SCS	Projects	-- 6/	45	--
River basin surveys and investigations, SCS	Plans	-- 6/	44	--
Forestry Incentives Program, ASCS				
Reforestation	M acres	-- 7/	174.3	--
Timber-stand improvement	M acres	-- 7/	26.4	--
Agriculture Conservation Program, ASCS				
Reforestation	M acres	-- 7/	86.4	--
Timber-stand improvement	M acres	-- 7/	17.8	--

1/ M = thousand, MM = million.
2/ -- = not applicable; goals for these items were not included in the 1985-2030 Resources Planning Act-Program.
3/ Includes Forestry Incentives Program and Agriculture Conservation Program accomplishments.
4/ Not all States reported due to lack of State grants.
5/ Unit of measure changed in 1986 from MM acres to person years. Historical person-year data unavailable.
6/ SCS transfer activities were not included in the RPA.
7/ RPA and funded targets for Forestry Incentives and Agriculture Conservation Program were included with those of Forest Resource Management above.

Table 54—Pesticide use report—fiscal year 1986

Common name	Target pest or purpose	Quantity used Pounds 1/	Acres treated Units 2/	
Herbicides:				
Amitrole	General weed control	6.00	4.00	
	Noxious weed control	287.00	505.00	
Amitrole/ 2,4-D	Noxious weed control	96.00	77.00	
		163.50		
Amitrole/ 2,4-D Dicamba	Noxious weed control	630.00	356.00	
		127.00		
		175.00		
Ammonium sulfamate	General weed control	171.00	123.00	
	General weed control	.95	125.00	stumps
	Noxious weed control	69.25	1.80	
	Poisonous plant control	63.00	35.00	
	Rights-of-way	90.00	8.00	
	Wildlife habitat	4,110.00	280.00	
Arsenal®	Rights-of-way	24.00	24.00	
Atrazine	Conifer release	33.00	11.00	
	Nursery weed control	84.00	42.00	
	Range management	95.00	80.00	
	Site preparation	92.40	24.30	
Atrazine/ Simazine	Rights-of-way	180.00	24.00	
		12.00		
Benefin	General weed control	24.00	20.00	
Bifenox	Nursery weed control	243.33	141.16	
Bromacil	General weed control	160.00	20.00	
Cacodylic acid	Site preparation	48.00	8.00	
Copper sulfate	Aquatic weed control	34.00	10.00	
Copper triethanol-amine	Aquatic weed control	14.00	17.00	
Dacthal®	Nursery weed control	361.88	56.71	
Dalapon	General weed control	2.40	4.00	
	General weed control	44.00	6.00	tree groups
	Site preparation	181.00	102.00	
Dicamba	Conifer release	170.00	85.00	
	General weed control	7.50	2.00	
	Noxious weed control	537.00	436.25	
	Poisonous plant control	2.00	1.00	
	Rights-of-way	32.75	43.00	
	Site preparation	1,238.00	1,027.00	
	Thinning	16.00	30.00	
Dicamba/ Triclopyr	Site preparation	145.00	76.00	
		134.00		
Dichlobenil	General weed control	5.00	1.00	
Diphenamid	Nursery weed control	292.50	20.00	
Diquat	Aquatic weed control	80.00	17.00	
	Aquatic weed control	34.00	15.00	acre feet
Diuron	Firebreak management	15.00	3.00	
	General weed control	16.00	5.00	
	Rights-of-way	408.00	110.00	
Endothall	Aquatic weed control	16.00	1.00	
	Aquatic weed control	358.00	47.00	acre feet
Fosamine ammonium	General weed control	405.00	2.00	
	Rights-of-way	1,274.00	133.80	
	Rights-of-way	364.00	25.00	side miles

See footnotes at end of table.

Table 54—Pesticide use report—fiscal year 1986—Continued

Common name	Target pest or purpose	Quantity used Pounds 1/	Acres treated Units 2/	
Herbicides: (Cont.)				
Glyphosate	Aquatic weed control	255.00	269.00	
	Conifer release	8,962.80	6,292.33	
	General weed control	581.01	251.19	
	General weed control	6.56	3.00	tree groups
	Hardwood release	342.00	1,250.00	
	Noxious weed control	1,992.77	946.25	
	Noxious weed control	1.00	5.00	side miles
	Nursery weed control	332.39	166.38	
	Poisonous plant control	5.00	4.00	
	Range management	136.00	188.0	
	Rights-of-way	260.00	104.00	
	Rights-of-way	4.00	2.00	side miles
	Site preparation	6,888.05	5,329.40	
	Site preparation	.20	240.00	square feet
	Wildlife habitat	83.00	52.00	
	Wildlife habitat	1.00	250.00	trees
	Research	36.53	83.00	
Glyphosate/ Hexazinone/ Triclopyr	Site preparation	32.00 32.00 128.00	37.00	
Glyphosate/ Oust®	Conifer release	114.00 14.25	114.00	
	Site preparation	922.20 54.77	538.00	
Hexazinone	Conifer release	48,224.00	31,418.00	
	Firebreak management	20.75	83.00	
	General weed control	4.00	2.00	
	Hardwood release	770.00	590.00	
	Noxious weed control	95.00	62.00	
	Range management	67.00	96.00	
	Rights-of-way	760.00	380.00	
	Rights-of-way	2.00	1.00	side miles
	Site preparation	51,616.80	20,529.00	
	Thinning	2,160.00	797.00	
	Wildlife habitat	609.00	520.00	
	Research	26.00	13.00	
Hexazinone/ Oust®	Conifer release	10.00 1.50	27.00	
Linuron	General weed control	38.50	21.00	
Maleic hydrazide	Rights-of-way	242.00	117.00	
MCPA	General weed control	170.00	85.00	
	Rights-of-way	4.00	1.00	
Mefluidide	General weed control	1.00	1.00	
	Rights-of-way	37.00	71.00	
Mefluidide/ Dicamba	General weed control	6.00 9.00	24.00	
Metolachor	General weed control	30.00	15.00	
MSMA	Rights-of-way	340.00	152.00	
Napropamide	Nursery weed control	34.50	23.00	

See footnotes at end of table.

Table 54—Pesticide use report—fiscal year 1986—Continued

Common name	Target pest or purpose	Quantity used Pounds 1/	Acres treated Units 2/	
Herbicides: (Cont.)				
Oryzalin	Rights-of-way	80.00	17.00	
Oust®	Conifer release	168.60	1,947.00	
	Conifer release	1.00	1,820.00	seedlings
	General weed control	86.81	1,149.00	
	Rights-of-way	18.93	131.00	
	Site preparation	8.37	133.00	
Paraquat	Noxious weed control	99.00	78.00	
Picloram	Conifer release	16.00	54.00	
	Noxious weed control	4,897.27	5,341.50	
	Poisonous plant control	182.00	130.00	
	Range management	770.69	1,457.00	
	Rights-of-way	681.00	222.00	
	Site preparation	505.50	201.00	
	Wildlife habitat	1,257.00	921.00	
Picloram/	Poisonous plant control	122.00	80.00	
Glyphosate		2.00		
Picloram/	Site preparation	1,008.00	252.00	
Triclopyr/		68.00		
2,4-DP/		932.00		
2,4-D		252.00		
Picloram/	Rights-of-way	22.00	40.00	
2,4-DP/		80.00		
Triclopyr		120.00		
Prometon	General weed control	6.00	4.00	
	Nursery weed control	3.00	4.00	
	Rights-of-way	788.50	20.01	
Sethoxydim	General weed control	1.50	1.00	
	Nursery weed control	237.00	172.00	
Simazine	Aquatic weed control	74.00	14.00	acre feet
	General weed control	40.00	12.02	
	General weed control	100.00	6.00	tree groups
	Hardwood release	48.20	21.00	
	Nursery weed control	5.00	6.55	
	Range management	18.00	1.00	
	Site preparation	56.00	18.60	
Simazine/	General weed control	6.00	1.00	
Glyphosate		1.00		
Tebuthiuron	Conifer release	200.00	100.00	
	Firebreak management	.21	7.50	
	Range management	150.00	300.00	
	Rights-of-way	636.00	161.00	
	Wildlife habitat	271.00	244.00	
Telar®	Noxious weed control	.50	5.00	
	Rights-of-way	3.06	76.00	
Triclopyr	Conifer release	17,458.50	12,042.00	
	Hardwood release	348.00	706.00	
	Noxious weed control	3.00	0.25	
	Range management	39.00	38.00	
	Rights-of-way	1445.40	702.50	
	Rights-of-way	202.00	20.20	side miles
	Site preparation	16,441.50	8,160.25	
	Thinning	570.00	504.00	
	Wildlife habitat	560.00	305.00	
	Research	44.18	141.00	

See footnotes at end of table.

Table 54—Pesticide use report—fiscal year 1986—Continued

Common name	Target pest or purpose	Quantity used Pounds 1/	Acres treated Units 2/	
Herbicides: (Cont.)				
2,4-D	Aquatic weed control	759.00	34.00	
	Conifer release	2,111.12	780.00	
	General weed control	14.50	33.00	
	General weed control	12.00	6.00	tree groups
	Hardwood release	760.00	275.00	
	Noxious weed control	2,683.29	2,323.25	
	Nursery weed control	141.00	125.00	
	Poisonous plant control	20.00	10.00	
	Range management	4,202.00	2,493.00	
	Rights-of-way	1,166.00	547.00	
	Rights-of-way	8.00	500.00	trees
	Site preparation	3,535.80	1,379.00	
	Thinning	4,040.00	1,504.00	
	Wildlife habitat	2,455.00	1,498.00	
	Wildlife habitat	1.00	15.00	trees
2,4-D/ Dicamba	Aquatic weed control	13.30 7.00	5.00	
	Noxious weed control	3,162.76 1,359.30	1,813.20	
	Poisonous plant control	100.00 13.00	50.00	
	Range management	22.00 22.00	40.00	
	Rights-of-way	62.00 62.00	24.00	
	Rights-of-way	28.50 15.00	5.00	side miles
2,4-D/ Dicamba/ Picloram	Noxious weed control	75.00 5.00 30.00	15.00	
2,4-D/ Dicamba/ 2,4-DP	Rights-of-way	8.00 2.00 8.00	18.00	
2,4-D/ Picloram	Conifer release	1,692.94 444.66	3,128.00	
	Hardwood release	518.00 271.00	756.00	
	Noxious weed control	2,704.86 1,013.69	3,200.20	
	Noxious weed control	12.00 3.00	32.00	side miles
	Poisonous plant control	6.00 1.50	3.00	
	Range management	18.00 28.00	55.00	
	Rights-of-way	253.90 64.60	67.00	
	Rights-of-way	32.00 8.00	660.00	side miles
	Site preparation	3,365.00 1,621.35	4,282.00	
	Thinning	565.00 171.00	596.00	
	Wildlife habitat	1,656.00 420.27	1,735.00	

See footnotes at end of table.

Table 54—Pesticide use report—fiscal year 1986—Continued

Common name	Target pest or purpose	Quantity used Pounds 1/	Acres treated Units 2/
Herbicides: (Cont.)			
2,4-D/ Picloram/ Triclopyr	Rights-of-way	464.00	323.00
		126.50	
		568.00	
	Site preparation	106.00	206.00
		21.00	
		150.00	
2,4-D/ Telar®	Noxious weed control	32.00	95.00
		2.00	
	Range management	9.00	26.00
		1.00	
2,4-D/ Triclopyr	Rights-of-way	46.20	14.30
		41.20	
2,4-D/ 2,4-DP	Rights-of-way	1,313.50	639.50
		1,312.50	
	Site preparation	124.00	272.00
		124.00	
2,4-D/ 2,4-DP/ Triclopyr	Rights-of-way	473.00	182.00
		473.00	
		2,038.00	
2,4-DP	Conifer release	3,407.00	1,428.00
	Site preparation	1,587.00	194.00
	Thinning	1,491.00	403.00
	Wildlife habitat	200.00	50.00
Total 1986 herbicide use		246,650.00	141,147.00

See footnotes at end of table.

Table 54—Pesticide use report—fiscal year 1986—Continued

Common name	Target pest or purpose	Quantity used Pounds 1/	Acres treated Units 2/
Insecticides:			
Azinphos-methyl	Cone and seed insects	4,601.00	237.00 (A)
	Cone midges	3,040.00	6,000.00 (A) trees
Bacillus thuringiensis	Gypsy moth	504,828.00 BIU	29,181.00 (A)
	Western spruce budworm	78,480.00 BIU	3,539.00 (A)
Carbaryl	Grasshoppers	124,120.44	99,302.08 (A)
Diflubenzuron	Gypsy moth research	4.00	74.00 (A)
Fenvalerate	Seedbugs	207.00	277.00 (A)
Malathion	Grasshoppers	231,103.00	476,729.04 (A)
Petroleum oil/ Carbaryl	Grasshoppers	8,000.00 32,000.00	32,000.00 (A)
Acephate	Cone and seed insects	2.50	208.00 trees
	Western spruce budworm	3,029.96	1,069.00 trees
Amdro®	Ants	4.20	100.00 bait stations
	Imported fire ant	1.00	9.00
	Imported fire ant	2.25	108.00 bait stations
Azinphos-Methyl	Cone borers	2,020.00	225.00
Bacillus thuringiensis	Mosquitoes	1,421.00 BIU	146.64
Bendiocarb	Ants	.01	4.00 buildings
Carbaryl	Fleas	100.00	80.00
	Mormon cricket	375.00	500.00
	Mountain pine beetle	196.00	147.00
	Mountain pine beetle	1,152.00	4,102.00 trees
	Pine tip moth	6.00	6.00
	Weevils	15.00	0.13
Carbofuran	Cone and seed insects	120.00	15.00
	Pales weevil	4.46	2,700.00 trees
	Seedbugs	42.00	40.00 trees
	Weevils	1.50	0.30
Chlorpyrifos	Nursery insects	35.30	35.30
	Pales weevil	25.00	100.00
	Southern pine beetle	1.00	5.00
	Southern pine beetle	17.00	105.00 trees
	Webworms	12.00	14.00
Coumaphos	Cattle ticks & lice	225.00	12,000.00 head of cattle
Diazinon	Ants	2.00	100.00 bait stations
	Aphids	.02	32.00 seedlings
	Cutworms	15.00	4.00
	Grass insects	50.00	100.00
	Miscellaneous insects	.05	30.00 trees
	Nursery insects	124.00	128.00
	Sawflies	.50	2.00
	Weevils	2.00	0.13
Dimethoate	Aphids	27.00	14.00
	Tip moths	7.00	4.00
Disulfoton	Birch leaf miner	6.00	1.00
Fenvalerate	Cone and seed insects	33.00	40.00
	Cone and seed insects	.01	10.00 trees
	Nursery insects	7.10	70.90
Hepatachlor	Ants	.10	7.00 treatment stations

See footnotes at end of table.

Table 54—Pesticide use report—fiscal year 1986—Continued

Common name	Target pest or purpose	Quantity used Pounds 1/	Acres treated Units 2/	
Insecticides: (Cont.)				
Lindane	Ambrosia beetles	1.64	4.00	tree groups
	Cone and seed insects	218.75	60.00	trees
	Cone moth	.25	600.00	grafts
	Greenhouse insects	.26	2.00	greenhouses
	Southern pine beetle	1.64	4.00	tree groups
	Southern pine beetle	64.08	2,009.00	trees
	Turpentine beetle	1.64	4.00	tree groups
Malathion	Aphids	.22	381,000.00	seedlings
	Cone and seed insects	400.02	6,012.00	trees
	Miscellaneous insects	7.00	40.00	buildings
	Mosquitoes	155.00	500.00	
	Scales	11.43	1.00	
	Spider mites	8.00	8.00	
	Tent caterpillars	3.00	1,375.00	trees
Methomyl	Miscellaneous insects	4.00	18.00	
Methoxychlor	Miscellaneous insects	.58	0.12	
Methyl bromide	Powder post bettles	150.00	1.00	building
	Termites	7.20	1.00	building
	Texas leaf-cutting ant	155.90	39.00	ant colonies
Oxydemeton-methyl	Aphids	13.00	44.00	
Permethrin	Seedbugs	8.44	1,300.00	trees
Petroleum oil	Mosquitoes	1,492.00	82.00	
Pheromones	Tussock moth	1.87	85.00	bait stations
Pyrethrins	Miscellaneous insects	.03	4.00	buildings
	Pine tip moth	3.00	6.00	
Total 1986 insecticide use (including aerial use)		413,445.35	643,645.64	
Total aerial use		403,075.44	641,339.12	

Plus 25,020 trees, 381,032 seedlings, 50 buildings, 39 ant colonies, 393 bait stations, 1,200 head of cattle

See footnotes at end of table.

Table 54—Pesticide use report—fiscal year 1986—Continued

Common name	Target pest or purpose	Quantity used Pounds 1/	Acres treated Units 2/	
Fungicides and Fumigants:				
Benomyl	Botrytis	72.00	144.00	
	Botrytis	6.00	650,000.00	seedlings
	Brown spot needle blight	4.87	157.00	
	Brown spot needle blight	3.90	17,000.00	seedlings
	Damping-off	4.00	20,000.00	seedlings
	Nursery fungi	722.00	86.00	
	Phompsis canker	30.00	60.00	
	Seedling blights	40.00	2.67	
Borax	Heterobasidion annosum	31.19	114.00	
	Heterobasidion annosum	1,693.25	71,350.00	stumps
Bordeaux Mixture	Nursery fungi	33.00	1.00	
Captan	Damping-off	80.60	68.50	
	Greenhouse diseases	.63	1,881.00	square feet
	Nursery fungi	.01	12.00	grafts
	Nursery fungi	1.14	71,000.00	seedlings
	Nursery fungi	3.60	2787.00	square feet
	Seed mold, mildew	.53	4,063.00	lb of seed
Chloropicrin	Nursery root rot	2,240.00	12.80	
Chloropicrin/ Dichloropropene	Nursery root rot	39.00 249.00	5.06	
Chlorothalonil	Botrytis	116.70	94.10	
	Botrytis	7.50	650,000.00	seedlings
	Lophodermium needle blight	286.00	131.00	
	Nursery blight	2.70	2.67	
	Nursery fungi	142.00	86.00	
Dazomet	Nursery fungi	3,217.50	9.00	
DCNA	Botrytis	119.50	119.50	
Dodine	Shot hole disease	5.00	4.00	
Ethazol	Damping-off	.50	500.00	square feet
Lime sulphur	Phoma blight	1.06	0.30	
	Powdery mildew	.31	0.30	
Maneb	Lophodermium needle blight	434.00	205.00	
Metalaxyl	Nursery root rot	6.90	5.50	
Methyl bromide	Nursery fungi	18.00	0.02	
	Nursery root rot	24.00	2,000.00	square feet
	Nursery root rot	12.00	600.00	square feet
Methyl bromide/ Chloropicrin	Damping-off	601.00 863.00	17.21	
	Fusarium	5,252.80 2,587.20	24.50	
	Nematodes	2,205.00 1,001.00	9.00	
	Nursery fungi	4,627.28 2,148.21	134.74	
	Nursery root rot	24,924.00 12,276.00	97.00	
Thiram	Damping-off	4.39	4,105.00	lb of seed
	Seed mold, mildrew	38.00	250.00	lb of seed
Triadimefon	Fusiform rust	108.00	68.00	
Total 1986 fungicide and fumigant use		66,284.27	1,658.87	

Plus 1,408,000 seedlings, 8,418 pounds of seed, 71,350 stumps, and 7,768 square feet

See footnotes at end of table.

Table 54—Pesticide use report—fiscal year 1986—Continued

Common name	Target pest or purpose	Quantity used Pounds 1/	Acres treated Units 2/	
Predacides and Piscicides:				
Antimycin	Undesirable fish	2.00	23.00	stream miles
Rotenone	Undesirable fish	10.00	10.00	
	Undesirable fish	1,363.00	9,404.00	acre feet
	Undesirable fish	20.00	23.00	stream miles
Sodium cyanide	Coyote	.05	30,000.00	
	Coyote	.46	13.00	treatment stations
Total 1986 predacide and piscicide use		1,395.51	39,414.00	
Repellents:				
Putrescent egg solids	Deer	3,526.00	14,092.00	
Thiram	Birds	416.00	3,575.00	lb of seed
	Deer	39.00	1.00	
	Rabbits	1,400.00	640.00	
Total 1986 repellent use		5,421.00	14,733.00	
Rodenticides:				
Aluminum phosphide	Ground squirrel	6.61	130.00	
	Ground squirrel	1.00	150.00	burrows
	Prairie dog	5.31	56.00	
	Prairie dog	1.00	200.00	burrows
Diphacinone	Ground squirrel	21.00	97.00	bait stations
Endrin	Mice	10.00	1,100.00	lb of seed
Sodium nitrate	Pocket gopher	62.50	1.00	
Strychnine	Pocket gopher	1,299.24	59,069.00	
	Pocket gopher	.12	95.00	burrows
Thiram	Other rodents	28.00	142.00	lb of seed
Zinc phosphide	Prairie dog	373.08	12,047.00	
Total 1986 rodenticide use		1,807.86	71,303.00	
Grand total pesticide use		735,003.99	911,901.51	

1/ Unless other units are indicated. BIU = billion international units.
2/ Unless other units are indicated. Aerial applications are indicated by (A). All others are ground application.

Table 55—Wildfires on State and private lands protected under the Cooperative Forestry Assistance Act (P.L. 95-313)—calendar year 1986

State, Commonwealth, or Territory	Area protected	Lightning fires	Person-caused fires	Total fires	Acres burned
	1,000 acres				
Alabama	25,029	36	7,603	7,639	152,530
Alaska	66,301	42	340	382	34,199
Arizona	18,328	78	240	318	16,081
Arkansas	19,728	50	1,931	1,981	18,986
California	31,182	273	6,965	7,238	223,282
Colorado	25,958	121	864	985	25,343
Connecticut	2,390	2	1,469	1,471	3,874
Delaware	557	1	89	90	1,127
Florida	27,102	1,065	7,529	8,594	444,857
Georgia	27,279	251	12,829	13,080	80,877
Guam	82	0	315	315	1,153
Hawaii	3,306	2	154	156	19,915
Idaho	6,026	232	233	465	8,017
Illinois	8,453	0	15	15	271
Indiana	7,328	1	148	149	628
Iowa	7,612	17	1,487	1,504	1,525
Kansas	19,793	165	4,271	4,436	34,121
Kentucky	16,936	2	1,728	1,730	40,533
Louisiana	20,939	16	4,831	4,847	49,303
Maine	17,743	44	1,289	1,333	5,705
Maryland	3,700	10	1,030	1,040	15,616
Massachusetts	3,581	6	7,749	7,755	11,098
Michigan	20,600	10	348	358	3,112
Minnesota	22,830	13	1,355	1,368	33,351
Mississippi	19,858	8	5,745	5,753	69,726
Missouri	16,587	6	1,428	1,434	11,160
Montana	48,633	251	320	571	5,661
Nebraska	27,154	174	864	1,038	48,673
Nevada	8,777	79	131	210	73,398
New Hampshire	4,631	15	1,737	1,752	1,282
New Jersey	2,735	5	1,825	1,830	10,329
New Mexico	40,199	105	239	344	27,018
New York	16,958	13	641	654	3,666
North Carolina	19,540	91	3,469	3,560	162,076
North Dakota	31,495	137	371	508	13,487
Ohio	5,823	0	518	518	1,810
Oklahoma	5,085	26	907	933	12,665
Oregon	13,099	213	852	1,065	5,432
Pennsylvania	19,541	10	1,265	1,275	6,720
Puerto Rico	829	0	529	529	1,811
Rhode Island	512	0	197	197	454
South Carolina	13,038	117	11,439	11,556	101,484
South Dakota	20,653	316	667	983	88,535
Tennessee	12,879	6	3,064	3,070	39,300
Texas	22,123	39	1,394	1,433	17,626
Utah	14,724	196	247	443	12,200
Vermont	4,638	5	361	366	577
Virginia	18,519	18	6,691	6,709	15,851
Washington	13,177	155	1,195	1,350	40,830
West Virginia	12,833	10	1,626	1,636	28,217
Wisconsin	18,898	68	1,059	1,127	3,507
Wyoming	21,341	335	917	1,252	56,185
Total	857,062	4,835	114,510	119,345	2,085,184

Table 56—Summary of selected cooperative forest management and processing program activities—selected fiscal years

	Woodland owners assisted	Timber-sale assistance--volume marked	Loggers and processors assisted
		MBF 1/	
1945	8,093	411,330	0
1950	22,828	518,566	0
1955	34,828	549,373	8,182
1960	82,188	569,178	8,099
1965	99,074	716,950	9,248
1970	115,197	1,225,520	13,620
1971	127,828	860,950	14,627
1972	274,001	955,627	5,290
1973	106,422	1,578,664	4,855
1974	117,990	907,311	5,353
1975	140,940	677,532	5,405
1976	105,184	596,599	15,318
1976-77 (T.Q.) 2/	25,253	220,649	5,849
1977	133,619	921,171	29,101
1978	165,329	1,120,743	12,749
1979	183,585	755,103	11,393
1980	176,385	870,964	11,582
1981	164,279	683,181	18,609
1982	141,472	841,475	15,470
1983	136,265	872,125	8,717
1984	151,539	1,033,440	10,082 3/
1985	134,338	913,411	-- 4/
1986	**137,753**	**855,813**	-- 4/

1/ MBF = thousand board feet.
2/ Transition quarter.
3/ Not all states reported.
4/ Inadequate data due to lack of State grants in wood-utilization program.

Table 57—Summary of selected cooperative forest management and processing activities, by Region—fiscal year 1986

Assistance activity	Unit of measure 1/	Regions				
		Northern	Rocky Mountain	South-western	Inter-mountain	Pacific Southwest
Woodland owners assisted	Number	2,161	3,129	201	736	3,629
Forest management plans prepared	Number	447	482	59	41	229
	M acres	35,170	23,929	14,941	2,056	33,032
Reforestation:						
Planting	Acres	546	396	247	535	5,113
Seeding	Acres	0	50	0	0	9
Management for natural regeneration	Acres	64	1,750	455	320	1,887
Timber stand improvement	Acres	1,052	2,721	261	2,516	4,218
Outdoor recreation development	Acres	2,001	3,187	6,686	1,054	30,145
Wildlife habitat development	Acres	295	4,932	7,271	1,181	10,450
Forested range improvement	Acres	235	5,317	9,535	615	3,421
Timber sale assistance volume harvested	M cubic feet	2,158	6,890	1,448	3,689	1,712
Urban forestry assistance activities	Urban areas assisted	188	549	12	119	683
Referrals to consulting foresters	Number	71	247	11	15	855

See footnotes at end of table.

Table 57—Summary of selected cooperative forest management and processing activities, by Region—fiscal year 1986—Continued

Assistance activity	Unit of measure 1/	Regions				Total
		Pacific Northwest	Alaska	Southern Region	North-eastern Area	
Woodland owners assisted	Number	6,463	228	63,400	57,806	**137,753**
Forest management plans prepared	Number	846	64	36,165	20,772	**59,105**
	M acres	76,792	4,500	2,433,787	1,197,462	**3,821,669**
Reforestation:						
Planting	Acres	19,938	250	483,032	42,920	**552,977**
Seeding	Acres	0	0	9,109	528	**9,696**
Management for natural regeneration	Acres	5,493	0	53,703	40,832	**104,504**
Timber-stand improvement	Acres	32,253	40	177,612	61,716	**282,389**
Outdoor recreation development	Acres	1	300	86,464	78,001	**207,839**
Wildlife habitat development	Acres	3,840	500	333,918	143,453	**505,840**
Forested range improvement	Acres	2,469	0	30,586	16,808	**68,986**
Timber sale assistance volume harvested	M cubic feet	11,133	4,923	120,490	99,570	**252,013**
Urban forestry assistance activities	Urban areas assisted	29	3	1,343	2,437	**5,363**
Referrals to consulting foresters	Number	132	22	5,856	6,941	**14,150**

1/ M = thousand.

Table 58—Summary of selected cooperative forest management and processing activities, by State—fiscal year 1986

State, Commonwealth, or Territory	Woodland owners assisted	Reforestation assistance	Timber-stand improvement assistance	Timber-sale assistance--harvest volume	State nursery production
		Acres	Acres	1,000 cubic feet	1,000 trees
Alabama	5,714	37,306	52,630	2,010	53,000
Alaska	228	250	40	4,923	420
Arizona	101	492	191	117	0
Arkansas	1,990	20,386	3,088	214	16,451
California	3,380	6,655	4,098	1,712	3,216
Colorado	1,030	729	411	4,870	1,457
Com. of N. Maria	3	11	5	0	5
Connecticut	1,264	1,082	171	85	2,000
Delaware	1,359	1,765	11	360	0
Florida	3,688	69,226	13,052	4,444	71,838
Georgia	10,109	125,138	6,133	2,838	120,802
Guam	14	42	11	0	44
Hawaii	232	301	104	0	397
Idaho	760	205	452	105	554
Illinois	6,689	1,449	4,266	1,029	2,375
Indiana	2,298	6,536	8,395	2,624	4,454
Iowa	1,283	4,617	1,337	717	2,815
Kansas	822	489	455	422	146
Kentucky	1,127	5,305	2,711	3,271	10,282
Louisiana	1,549	17,274	21,376	493	44,000
Maine	736	2,982	1,398	762	1,212
Maryland	4,957	4,388	1,396	10,903	3,938
Massachusetts	2,553	13,975	3,740	12,881	0
Michigan	1,487	2,355	1,633	1,991	3,810
Minnesota	5,061	8,859	3,108	7,847	18,643
Mississippi	14,915	88,480	18,965	8,835	67,651
Missouri	2,120	3,430	4,692	3,965	6,128
Montana	651	272	584	2,035	986
Nebraska	1,088	155	66	33	0
Nevada	538	700	2,449	3,180	153
New Hampshire	3,248	793	3,246	3,220	300
New Jersey	838	609	857	406	762
New Mexico	100	210	70	1,331	16
New York	3,306	7,121	12,942	25,633	6,045
North Carolina	5,304	60,475	3,561	27,815	40,817
North Dakota	750	133	16	18	1,268
Ohio	3,375	2,188	4,747	2,549	5,400
Oklahoma	825	2,609	515	261	3,883
Oregon	4,935	19,392	26,906	201	17,658
Pennsylvania	2,405	1,575	2,584	1,725	3,694
Puerto Rico	2,338	588	648	23	533
Rhode Island	179	188	470	766	0
South Carolina	4,739	40,129	4,817	1,760	65,465
South Dakota	101	823	157	1,164	1,519
Tennessee	1,691	3,807	172	2,009	7,604
Texas	2,212	21,170	32,667	6,046	18,265
Utah	198	155	67	509	215
Vermont	2,454	505	2,436	5,403	500
Virginia	7,199	53,951	17,277	60,471	65,243
Washington	1,528	6,039	5,347	10,932	12,100
West Virginia	3,397	2,852	1,629	2,550	15
Wisconsin	8,797	17,011	2,658	14,154	19,453
Wyoming	88	0	1,632	401	0
Total	137,753	667,177	282,389	252,013	707,532

Table 59—Works of improvement installed on small watershed protection projects—fiscal years 1983-86 and total to date (P.L. 566 Act of 1954)

	Unit of measure	1986	1985	1984	1983	Total 1954-86
Channel improvement	Miles	0	2	0	0	6.6
Channel stabilization	Miles	0	2	0	0	13
Contour terrace and furrows	Miles	0	0	0	0	916
Area treated	Acres	0	0	0	0	1,440
Gully control and stabilization	Miles	0	1	0	0	195
Grade stabilization structures	Number	0	0	0	0	3,296
Critical area stabilization by tree planting and other measures	Acres	1,360	1,014	825	464	46,133
Forest road and roadbank stabilization	Miles	21	4.3	1	2.2	1,970.2
Area treated	Acres	64	5	12	2.4	6,028.7
Fire roads, trails, and firebreaks and fuelbreaks	Miles	18	19	19	35.6	1,694.2
Fire control water developments	Number	0	0	0	0	43
Fire towers	Number	0	0	0	0	8
Intensified fire protection	Acres	1,015	313,365	251,999	56,230	2,641,344
Heliports and helispots	Number	0	0	0	0	42
Mobile fire equipment	Number	0	2	8	7	75
Other fire control improvements	Number	0	3	1	5	468
Radio installations	Number	0	5	1	0	53
Forest watershed management						
Plans prepared	Number	581	675	748	723	25,983
Area included	Acres	32,509	35,401	39,979	45,129	2,220,579
Forest stand improvement	Acres	1,617	0	0	0	1,084,083
Proper harvest cutting	Acres	2,415	2,481	6,334	7,463	555,907
Range and grass seeding	Acres	709	86	133	12	49,231
Tree planting and seeding	Acres	9,089	4,753	7,003	6,240	314,529
Revegetation, surface mined areas	Acres	12	41	0	1	3,434
Woodland grazing control	Acres	22	1,137	2,685	3,370	297,212
Recreation area development	Acres	730	966	290	145	33,780
Wildlife habitat development	Acres	1,102	3,745	6,671	5,910	46,417
Wildlife ponds	Number	0	2	2	0	84

Table 60—Works of improvement installed in flood prevention projects—fiscal years 1983-86 and total to date (P.L. 534 Act of 1944)

	Unit of measure	1986	1985	1984	1983	Total 1944-86
Structural measures:						
Access road construction	Miles	**6**	0	108.5	107	381.5
Channel improvement	Miles	**0**	0	0	1	40.6
Channel stabilization	Miles	**2**	0	0	0	353.0
Diversion ditches	Feet	**0**	0	1,320	0	32,097.0
Floodwater retarding structures	Number	**0**	0	0	1	4.0
Grade stabilization structures	Number	**2**	0	0	0	1,692.0
Streambank stabilization	Miles	**0**	0	0	0	11.3
Land treatment measures:						
Critical area stabilization by tree planting and other measures	Acres	**768**	1,008	349	1,360	335,936.0
Forest road and roadbank						
Stabilization	Miles	**64**	36.8	38.3	34	2,837.0
Area treated	Acres	**722**	456.5	140	206	20,912.0
Forest watershed management						
Plans prepared	Number	**403**	484	593	599	25,569.0
Area included	Acres	**19,833**	27,666	34,935	25,588	2,201,413.0
Firebreaks and fuelbreaks	Miles	**15**	0	21	36	3,482.0
Fire roads and trails	Miles	**4**	64	2	46	629.0
Fire hazard reduction	Acres	**13,100**	5	6,810	5,479	40,126.0
Fire water developments	Number	**9**	0	1	1	196.0
Fire towers	Number	**0**	0	0	0	46.0
Heliports and helispots	Number	**0**	0	0	0	461.0
Mobile equipment	Number	**14**	0	0	0	134.0
Other fire improvements	Number	**0**	0	0	0	226.0
Permanent radio installations	Number	**0**	0	0	0	318.0
Proper harvest cutting	Acres	**1,697**	4,733	13,967	7,644	681,912.0
Forest stand improvement	Acres	**838**	0	0	0	661,792.0
Tree planting and seeding	Acres	**2,693**	3,130	3,914	1,792	528,114.0
Woodland thinning and release	Acres	**0**	1,865	2,376	1,410	458,486.0
Revegetation, surface mined areas	Acres	**161**	375	351	144	8,589.0
Woodland grazing control	Acres	**777**	590	60	412	191,812.0
Woodland owners assisted	Number	**2,835**	2,425	6,299	8,562	645,874.0

Table 61—Forest Research funding—fiscal year 1986 compared to 1982-86 average 1/

	1986		1982-86	Percent of
	Actual	RPA	average	actual to average
	1,000 constant 1986 dollars 2/			
Appropriated funds:				
Land and resource protection research:				
Fire and atmospheric science	7,716	7,904	8,791	88
Forest insect and disease	20,186	20,575	22,693	89
Forest inventory and analysis	16,316	16,811	15,167	108
Renewable resources economics	4,370	4,516	5,029	87
Renewable resources management and utilization research:				
Timber management	21,501	22,080	22,892	94
Watershed management and rehabilitation	14,850	15,180	12,723	117
Wildlife, range, and fish habitat	9,072	9,284	9,714	93
Forest recreation	2,049	2,133	2,252	91
Forest products and harvesting	17,560	17,940	19,806	89
Special projects, competitive grants 3/	(6,507)	-- 4/	(2,912)	223
Subtotal	113,620	116,423	119,067	95
Research construction	642	348	747	88
Total, appropriated accounts	114,262	116,771	119,814	95
Reimbursable accounts	5,746	-- 4/	5,150	112
Grand total	120,008	116,771	124,964	96

1/ General administration has been eliminated from individual line items in calculating the average. Total appropriated general administration funds are included in the "General Administration" line item in tables 10 and 11.
2/ Survey of Current Business (BEA) index values used for 1982-85. BEA updates GNP implicit price deflators periodically. These are current as of June 1986.
3/ Funds transferred to the Office of Competitive Grants included here as a non-add item.
4/ --= not reported in the RPA.

Table 62—Forest Research funding—fiscal years 1982-86 1/

	1986	1985	1984	1983	1982
			1,000 dollars		
Appropriated funds:					
Land and resource protection research:					
Fire and atmospheric science	**7,716**	7,963	7,783	8,484	9,014
Forest insect and disease	**20,186**	21,147	22,129	21,577	20,942
Forest inventory and analysis	**16,316**	17,133	12,128	12,337	13,332
Renewable resources economics	**4,370**	4,513	4,748	4,979	4,841
Renewable resources management and utilization research:					
Timber management	**21,501**	22,161	22,137	20,585	20,710
Watershed management and rehabilitation	**14,850**	11,229	11,242	10,961	11,400
Wildlife, range, and fish habitat	**9,072**	9,108	9,163	8,706	9,334
Forest recreation	**2,049**	2,084	2,085	2,146	2,150
Forest products and harvesting	**17,560**	18,488	17,988	17,897	20,422
Special projects, competitive grants 2/	**(6,507)**	(7,840)	0	0	0
Subtotal	**113,620**	113,826	109,403	107,672	112,145
Research construction	**642**	1,634	422	454	388
Total, appropriated accounts	**114,262**	115,460	109,825	108,126	112,533
Reimbursable accounts	**5,746**	5,159	5,192	3,563	4,545
Grand total	**120,008**	120,619	115,017	111,689	117,078

1/ General administration has been eliminated from individual line items. Total appropriated general administration is included in tables 10 and 11.

2/ New account in 1985. Funds are transferred to the Competitive Research Grants Office, in Science and Education, Department of Agriculture, which administers the competitive grants research program.

Table 63—Extramural research funded through the Forest Service—fiscal years 1985-86

Type of recipient	1986		1985	
	1,000 dollars	Number of grants	1,000 dollars	Number of grants
Domestic grantees:				
Universities and colleges:				
Land-grant research institutions	5,995	213	4,123	225
S&E-CR 1/	-- 2/	--	162	3
1890 Land-Grant and predominately black institutions	169	13	114	5
Other non-Land-Grant institutions	2,082	90	2,224	92
Subtotal, universities and colleges	8,246	316	6,623	325
Other domestic:				
Industrial firms	119	2	--	--
Profit organizations	--	--	5	1
Nonprofit institutions and organizations	945	17	149	8
Federal, State, and local governments	327	10	315	20
Private individuals	135	6	69	5
Small business innovation research	266	9	302	11
Subtotal, other domestic	1,792	44	840	45
Total, domestic	10,038	360	7,463	370
Foreign grantees:				
Universities and colleges	6	1	14	2
Government agencies	--	--	--	--
Nonprofit institutions and organizations	278	3	--	--
Private individuals	7	2	1	1
Total, foreign grantees	291	6	15	3
Grand total	10,329	366	7,478	373

1/ Grants executed by Science and Education-Cooperative Research with Forest Service Accelerated Pest Program funds.
2/ -- = not applicable.

Table 64—Research publications by major subject area—fiscal years 1983-86

	Number of publications			
	1986	1985	1984	1983
Environmental Research:				
Watershed management	138	154	95	168
Wildlife	165	136	138	134
Range	94	64	88	101
Fisheries habitat	26	18	37	28
Forest recreation	65	69	59	87
Urban and community forestry	45	36	25	41
Disturbed areas rehabilitation	26	34	40	39
Atmospheric deposition and air pollution	39	35	24	15
Subtotal	598	546	495	598
Insect and Disease Research:				
Insect detection and evaluation	57	69	30	13
Insect biology	98	94	138	107
Insect control and management strategies	92	119	102	119
Disease detection and evaluation	65	51	10	8
Disease biology	48	45	55	85
Disease control and management strategies	29	37	48	48
Mycorrhizae	21	50	26	23
Wood products organisms	18	24	23	37
Subtotal	428	489	443	455
Fire and Atmospheric Sciences Research:				
Fire prevention, hazard reduction, and prescribed burning	20	19	11	18
Fire management methods and systems	21	25	27	37
Forest fire science	28	23	8	23
Ecological relations	19	35	19	27
Weather modification and weather effects	19	35	30	32
Subtotal	107	137	95	137
Timber Management Research:				
Forest biology	158	109	130	117
Silviculture and management	162	196	293	247
Growth and yield 1/	69	68	-- 2/	--
Genetics and tree improvement	87	100	89	104
Subtotal	476	473	521	488

See footnotes at end of table.

Table 64—Research publications by major subject area—fiscal years 1983-86—Continued

	Number of publications			
	1986	1985	1984	1983
Economics and Marketing Research:				
Forest resource evaluation	143	110	119	99
Forest economics	205	182	142	128
Subtotal	348	292	261	227
Products and Engineering Research:				
Forest engineering systems	71	84	66	50
Wood structural engineering	53	52	43	53
Chemistry, fiber, and fuel products	62	59	84	91
Utilization potential and processing of wood	135	133	126	130
Protection of wood in use	31	13	24	13
Subtotal	352	341	343	337
General	21	21	31	17
Grand total	2,330	2,299	2,189	2,259

1/ This subject area was not reported separately prior to 1985. In earlier years, publications were reported elsewhere in Timber Management Research.
2/ -- = not applicable.

September 19, 1986

TEXT OF A LETTER FROM THE
PRESIDENT TO THE SPEAKER OF THE
HOUSE OF REPRESENTATIVES
AND THE PRESIDENT OF THE SENATE

September 19, 1986

Dear Mr. Speaker: (Dear Mr. President)

I am pleased to transmit to the Congress my Statement of Policy regarding Federal management and use of our Nation's renewable forest and rangeland resources for FY 1986-1990, pursuant to the Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974. Accompanying this policy statement is the third Renewable Resource Program prepared by the Secretary of Agriculture.

Sincerely,

RONALD REAGAN

STATEMENT OF POLICY

The fundamental policy principle for the management of Forest Service programs in my Administration is the principle of judicious balance.

In both long-range planning and in day-to-day decisions our forest managers and scientists must strive for judicious balance among:

- o the needs of this and future generations of Americans for the various benefits obtainable from our Nation's forest lands;
- o the need for protection of unspoiled wilderness lands and the need for harvesting timber and forage and recovering minerals to sustain a growing national economy;
- o the need to produce direct economic benefits for our people, and the need to produce benefits that do not have a specific dollar return such as outdoor recreation opportunities and wildlife habitat;
- o the need to invest in the National Forests and the need to meet the other demands on the Federal budget each year; and
- o the share of the costs of the system to be paid by the general taxpayers, and the share to be paid by specific users of our National Forests.

Achieving the balance we seek is not an easy process. Because we as individuals and as interest groups may place widely divergent values on a particular potential management action, and because our society encourages active participation by the public in governmental decisions, our major choices are often preceded by conflict and followed by dissent. Nevertheless we have a responsibility to make the choices and decisions necessary to manage our forest resources, and we must make them judiciously.

During my Administration the number of designated wilderness areas managed by the Forest Service has doubled, to 329 areas comprising over 32 million acres, while the remaining 159 million acres, managed under the principles of multiple use and substained yield, have produced 11 billion board feet of timber harvest annually, and 225 million recreation visitor days annually, as well as productive wildlife habitat and oil, gas, and other minerals to sustain our economy. Capability on non-Federal lands has grown as well, as has our store of new technology to accomplish these output levels in a way that carefully preserves environmental and economic values. Where conflict in the management of these resources was inevitable, we have sought the judicious balance.

The Secretary of Agriculture's Recommended Program for the Forest Service, called for by the Resources Planning Act, sets forth a plan within which we can achieve the balance we seek. It identifies a reasonable range of management directions, outputs, costs, and goals for the long-term future. It provides the Congress and the public with a valuable information base on which to continue their informed participation in the decisions affecting our National Forests.

I trust we will eontinue to work together to ensure that our valuable forest resourees arc managed judiciously for the benefit of all our people --of this generation and of generations yet to come.

The RPA logo from the 1985 Program Update illustrates integrated natural resouree management for Americans. The small eircles (from top and cloekwise) depict the linked interrelationship in the multiple-use ehain of resources: air and water, minerals and energy, range, outdoor recreation, timber, wildlife and fish. The outer circle symbolizes the national and continuous planning of the three major Forest Service program areas...National Forest System; State and Private Forestry; Forest Researeh...as exemplified by the RPA Recommended Program for the period 1985 through 2030.

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The Forest Service
United States Department of Agriculture